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A. P. BLESING, *Minister of Agriculture*

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Agricultural Bureau Conferences, 1937

Murray Lands East, at Taplan, Tuesday, 28th September (Mr. G. R. Hodge and Mrs. Hodge).

Eyre's Peninsula (East), at Cowell, Monday, 18th October (Mr. S. D. Ramsey, Cowell), Miltalie Branch.

Eyre's Peninsula (Lower), at Ungarra, Wednesday, 20th October (Mr. W. G. Gordon).

Eyre's Peninsula (Central), at Poochera, Friday, 22nd October (Mr. F. R. Joy).

Hills Districts, at Mount Pleasant (Conference and Field Day), Wednesday, 28th October (Mr. W. K. Johns).

Fruit Districts, at McLaren Flat, Tuesday, 2nd November (Mr. W. H. Kyloh).

Each Conference will commence at 10.30 a.m. Members of Branches are invited to submit papers and questions for the agenda of the Conference in their respective districts.

Overseas Wheat Quotations

By courtesy of the New South Wales Marketing Bureau, the South Australian Department of Agriculture is supplied regularly with statements showing overseas quotations for wheat to the nearest eighth of a penny. The accompanying table gives weekly quotations in London, the State or country of origin of the wheat, and months of shipment or delivery.

Date of Quotation.	London Values.							
	S. Aus. Wheat.	W. Aus. Wheat.	Manitoba No. 3 Wheat ex Atlantic Ports.	Argentine Wheat.	Karachi Choice White Wheat.	American Hard Winter Wheat.	White North Pacific Wheat.	
	July.	July.	July.	Jan-Feb.	July-Aug.	July-Aug.	Sept.	
1937.	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.	
July 15..	5 10⅞	6 0	6 5½	5 10	5 8¼	6 1⅞	5 9⅜	South Australia—8,000 tons sold on arrival at 5s. 10½d.
July 22..	5 10½	5 9¾	6 3⅜	5 9¼	5 6¾	5 11¼	5 6¾	—
July 29..	5 9	5 7⅞	6 0	5 7¼	5 5⅝	5 9⅜	5 7	Victoria—7,335 tons (May), ex steamer at 5s. 6¾d. South Australia—7,400 tons (afloat), 5s. 6½d. (net); 8,500 tons (loading), 5s. 7⅛d.; 7,748 tons (June), ex steamer, 5s. 6¾d.
	Aug.	Aug.	Aug.		Aug.-Sept.	Aug.-Sept.		
Aug. 5..	5 7½	5 4½	5 9⅜	5 6¾	5 3¾	5 7⅛	5 4½	New South Wales—8,528 tons (June), 5s. 3½d. South Australia—5,000 tons (July), 5s. 3¾d. Victorian—8,528 tons (June), 5s. 3d.
Aug. 12..	5 6¾	5 3¾	5 10¾	5 6	5 3¾	5 5⅞	—	Russian—5s. 4½d. (Aug.-Sept.).

THE JOURNAL
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Progressive Centennial Development of the Pastoral and Agricultural Industries of South Australia, 1836—1936

[By ARTHUR J. PERKINS, O.B.E., Life Member of the Advisory Board of Agriculture and of the Agricultural Bureau, Chairman of the Governing Council of the Roseworthy Agricultural College, sometime Director of Agriculture (1914-1936), Principal Roseworthy Agricultural College (1904-1914), &c.]

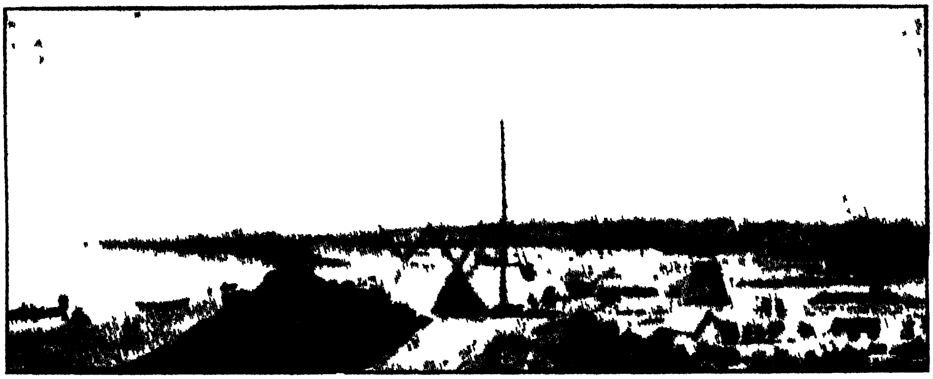
(*Continued from page* 913.)

THE FIRST DECADE, 1836-1846.

CHAPTER VII.

Governor Gawler assumes administration of Government—Receives addresses by Civil Officers and Residents of Adelaide—Gawler both Resident Commissioner and Governor—Biographical Notes on life of George Gawler—Character Sketch of George Gawler—Rehabilitation and Progress of the Surveys.

On 28th April, 1838, "the Queen was pleased to appoint Lieutenant-Colonel Gawler Governor and Commander-in-Chief of the Province of South Australia" in succession to Captain John Hindmarsh, recalled: on 11th June, the newly-appointed Governor, accompanied by his family and his Private Secretary—Lieutenant George Hall—set sail from London aboard the *Pestonjee Bomanjee,* Captain J. R. Hall: and "after a pleasant passage of about four months" came to anchor in Holdfast Bay on Friday, the 12th October. On the Wednesday following Colonel Gawler "formally assumed the administration of the Government of the Province. As early as 10 o'clock a large concourse of the principal colonists, on foot and on horseback, proceeded to the first belt of trees on the Glenelg Road to meet His Excellency and escort him to Government House"—or what passed as such. "Precisely at the hour appointed His Excellency, accompanied by the Acting-Governor, Mr. Stephen, met the cavalcade consisting of at least a thousand persons, and proceeded to Government House amid general acclamation. A Council was then held at which His Excellency's commission as Governor and Commander-in-Chief was produced and read. His Excellency also took the usual oaths in Council, and attended by the members and the Civil Officers proceeded to the front of Government House, where the inhabitants were assembled. A circle was formed and His Excellency said that having in obedience to Her Majesty's instructions laid before the Council his commission as Governor and Commander-in-Chief, he now called upon His Honor the Judge to administer to him the oaths as Governor. This was done accordingly and His Excellency then produced his appointment under the Sign Manual as Resident Commissioner, and the oath was administered to him by His Honor the Judge." (¹)



Landing place south of Patawalonga

[*Plate 44*] Painting by Col Wm Light

[*From "Life and Letters of Sir John Morphett'*

After the Sheriff—C. C. Dutton—had read the usual Proclamation the late Acting-Governor—G. M. Stephen—presented on behalf of the Civil Officers an address of welcome to the Governor. In reply to the latter, and thus early in his term of office, Colonel Gawler gave veiled, but unmistakable intimation that he was not unaware of the internecine dissensions that had been the bane of his predecessor's South Australian days; and that if need were, under his administration, they would find an iron grip within the velvet glove. "Nothing," he said, "can be more injurious to the public welfare than an administration divided against itself. I am deeply responsible that every member of the Government should fulfil with activity, fidelity and intelligence the duties of his office: and *such a course of conduct from all I shall unflinchingly require.*" (²) The oaths of office were subsequently administered to the members of the Council: and the ceremonies closed with an address of welcome from the Residents of Adelaide and its vicinity presented to the Governor by the Sheriff, supported by a deputation of colonists, and to which the former made appropriate reply.

It will be observed that under the regime that was about to open the duties of Resident Commissioner, which hitherto had included unfettered control of all land and immigration matters, and to some extent finance as well, had become merged in those of the Governor: or in the words of Colonel Gawler himself: "After he had received his commission as Governor, he accepted in

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(¹) *South Australian Gazette and Colonial Register*, 20th October, 1838, page 2, col. 3.

(²) *Southern Australia*, 20th October, 1838, page 3, cols. 3 and 4.

addition to it, the most laborious and responsible office of Resident Commissioner, without salary or emolument, in order that there might be a united administration." (⁸) And in this fashion it was hoped that the ineluctable evils of "diarchy" which had embittered the days of Hindmarsh and Fisher, would be scattered for ever to the four winds of the earth: and of this and all its implications the *Gazette and Register* having expressed unqualified approval, the *Southern Australian* could predict but "woe." David McLaren's reactions to the new conditions, on the other hand, were highly characteristic, as the following successive extracts from his London correspondence will serve to show:—4th October, 1938, *i.e.*, about one week prior to Gawler's arrival in South Australia, he hoped "the fond expectations indulged in England and South Australia" over the new Governor would be fully realised, "but he would have a very difficult part to perform." 10th November, 1838, *i.e.*, about four weeks after Gawler's arrival, "the union in one person of the powers of the Governor and Resident Commissioner will of course prevent those complicated movements which formerly obtained, but it places colonists"—and presumably the South Australian Company—"in disadvantageous circumstances in the negotiations with the Commissioner, rendering his power absolute." Obviously already the shoe had begun to pinch. 11th May, 1839, *i.e.*, seven months after Gawler's arrival, "As a friend to Colonel Gawler, as well as deeply interested for the general interest of the colony, and *the particular interest of the South Australian Company,* I say do what you can to have the offices separated!" *i.e.*, the Resident Commissionership from the Governorship. In other words, the fisherman of the South Australian Company preferred fishing in troubled waters, even though anarchy were to ensue thereby.

Colonel George Gawler, who was in the prime of life when appointed Governor of South Australia—slightly over 43 years of age—had had in his early manhood a conspicuous military career. He was the only son of Captain Samuel Gawler, of the 73rd Highland Regiment, who was killed at the storming of Fort Muggerall in Mysore, in 1804, and of Julia Russell, of Sturrey. He was born on the 21st July, 1795, and had the misfortune to lose both his father and his grandfather in his ninth year, the former of whom he had never seen. He owed his early education to a private tutor, and subsequently to a school at Islington, whence on 8th October, 1808, he was accepted as a "Gentleman Cadet" at the Royal Military College, at Great Marlow, Bucks. At the latter institution he seemed to have distinguished himself, since he was described "as one of our cleverest cadets" on his appointment to an Ensigncy in the famous 52nd Regiment of Light Infantry, on the 4th October, 1810, at the early age of fifteen years and three months. His regiment having been ordered to active service he debarked at Lisbon on 2nd January, 1812, and was thereafter engaged in the Peninsular War to its close. He was wounded at the siege of Badajos, and promoted to a Lieutenancy: and again, at Munoz. For his services in Spain he was awarded the Military Medal with seven clasps. He accompanied his regiment in the subsequent invasion of Southern France: and later still, was present at the Battle of Waterloo when he led the right wing Company of his regiment in its charges on Napoleon's celebrated Imperial Guard. Gawler's battalion formed part of the Army of Occupation in France to the end of 1818, when it returned home to England. On the 21st September, 1820, George Gawler was married to Maria, daughter of John Cox, of Derby. In July, 1823, the 52nd Regiment left England for New Brunswick, and Gawler was given the command of a company stationed at St. Andrews, in which position he and his wife appeared to have endeared themselves to the inhabitants.

(⁸) *South Australian Gazette*, 4th July, 1839, pages 2-5.

In 1829 the Gawlers returned to England: in February, 1831, he was promoted Major, and in August, 1834, Lieutenant-Colonel (unattached). (4)

After a close examination of his character and attainments, and a panoramic glance at his early career, and subsequent conduct and achievements in South Australia, it can be confidently asserted that few, if any, could have been found better qualified than George Gawler to take up the difficult and onerous task of governing South Australia in 1838 and the immediately succeeding years. (5) That he was possessed of great physical courage and resourcefulness he had proved on many a battlefield: that with these he combined moral courage of a high order was shown by his unhesitating assumption of responsibility, when need was: by unflinching maintenance of what he deemed right gainst a clamouring multitude—the very arbitrariness with which he was taunted by his opponents: by the resoluteness with which he dealt with delinquencies of obstructing officers, or supported those whom he deemed to have been unfairly dealt with. He had a cultured understanding, and with it an adequate talent for literary expression and exposition: but above all perhaps, he had been well endowed with worldly wisdom or commonsense: in the latter connection Sir John Macdonald, Adjutant-General of the British Army, told Colonel Torrens—Chairman of the Board of Colonisation Commissioners—in reply to the latter's enquiries as to Gawler's qualifications, that he was one of the very best officers in the army, and that he could not conceive it possible that Gawler should ever do a foolish thing. (6) And for the practical purposes of life what more could have been said in his favour?

Barossa Ranges.

[*Plate* 45.] Painting by G. Fife Angas.

[*From "Life and Letters of Sir John Morphett"*

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(4) George Gawler K.H., 52nd Light Infantry, by Jane Cox Gawler per C.W.N.

(5) For the condition of the colony at the time as described by Gawler see Appendix V. at the back of the volume.

(6) Second report of the Select Committee—Appendix of Documents, page 163.

His uprightness and rectitude of conduct we cannot imagine to have been other than unimpeachable: but regrettably enough from the standpoint of his personal comfort, it must be recorded that he showed little or no evidence of having been gifted with a sense of humour. Nevertheless, he was very far from being all austerity: a sincere love of his fellow creatures irradiated all his actions, and usually succeeded in attracting to him reciprocated affection; his aversion from the use of military rigour for the suppression of unarmed civil disturbances; his efforts to remedy the conditions under which pauper emigrants were brought out to Australia; his deepest sympathy with the dispossessed aboriginal tribes of Australia; his interest in, and support of all charitable objectives properly brought under his notice; the remarkable outbreak of regret that characterised his departure from both Canada and Australia: all these things bore witness to his humanity and the sterling goodness of his character.

Nor in any attempted estimate of Gawler, the man, was it possible to overlook the sincerity and depth of his religious convictions and missionary spirit. In these, as in many other features of his character and fortunes, Colonel Gawler might well have stood for the prototype or exemplar of another heroic figure of the immediately succeeding generation, namely, Major-General Charles George Gordon—"Chinese" Gordon—martyred Gordon, who in 1885 forsaken of all, calmly awaited his doom at Khartoum, that the Soudan might be saved from Mahdism. Endowed as he was with high intelligence, high courage, determination, wisdom, it did not seem that a man of Gawler's calibre could possibly have failed in the task that had been set him: or from the standpoint of achievements—the only acceptable standard in such circumstances—did he fail: he stamped out disaffection and enforced discipline upon a recalcitrant public service; put the Survey Department upon its feet and accelerated the rate of its action; placed colonists upon their holdings as rapidly as circumstances admitted; found employment for a vast army of emigrants, many of whom were unsuited for rural work, and others for whom such work could not at the time be found: and in so doing he saved a young colony from anarchy and unimaginable distress.

But in bringing to a successful issue the tasks that had been imposed upon him, Gawler—the man on the spot—found himself obliged to incur public expenditure in excess of what the Home authorities—located 12,000 miles away and never having even sighted the spot—deemed reasonable: and accordingly in 1841—at the comparatively early age of 46, and normally with many years of useful active life ahead of him—Gawler was recalled by the Secretary of State for the Colonies (⁷) with the same cynical brutality that some twelve months earlier had characterised the latter's dismissal of the Colonisation Commissioners for South Australia. "Colonel Gawler's recall," said his biographer, "came as a great blow to him, which may be safely said, he never got over. For if this brave soldier had a shadow of weakness, it was pride of office and love of military display. But more than all this, a nature such as his felt keenly the bitter injustice of the whole proceedings. For a long time he underwent many anxieties in attempted defence of his Governorship, until wearied and disgusted with routine and red tape he retired from public life." (⁸) And thus General Gordon who perished at the moment of apparent failure, which was but the presage of future success, was perhaps happier in death than Colonel Gawler, who having successfully accomplished his task, was ignominiously dismissed from office, never again to be given active employment although allowed 28 bitter years to meditate on the ingratitude of rulers of men.

(⁷) Lord John Russell.

(⁸) George Gawler K.H., 52nd Light Infantry, by Jane Cox Gawler, per C.W.N.

The *Eden,* as we saw, set sail from England on the 26th June 1838, with G. S. Kingston and his instructions aboard; including orders for a "Running Survey" and the dismissal of one of the junior surveyors to make room for for Corporal McLaren, who was accompanying Kingston to Australia. This was the reply of the Colonisation Commissioners to Colonel Light's urgent but preposterous request for the appointment of additional surveyors; and three and a half months later—11th June, 1838—when Colonel Gawler set out for his new appointment, the Commissioners were probably still congratulating themselves on the anticipated results of the energetic measures they had adopted for the better working of the Survey Department; and no doubt the departing Governor was allowed to share in their satisfaction. But unfortunately these "energetic measures," like many other plans of men, had gone all awry: and instead of a strong and active department such as had been pictured to him in England, the astonished Governor was confronted with a Deputy Surveyor-General, of doubtful professional antecedents, in command of one assistant-surveyor and one draughtsman; (⁹) and in the background a menacing crowd of settlers clamouring for land. Here then was undoubtedly *the task of the moment*—the rehabilitation of a broken down Survey Department—and into it Governor Gawler was not slow to throw all his energies. As early as 29th October, *i.e.,* nine days after his assumption of the reins of Government, he wrote to the Secretary of State for the Colonies that "the establishment of surveyors was altogether unequal to the demand . . . and great disappointment had" accordingly "been felt on the subject. It was his intention, with the consent of the Council, to put on every surveyor that he could procure, until the survey came up, or nearly up to the demand." (¹⁰)

The importance and extent of the Survey work done by G. S. Kingston since his return from England, and the difficulties that had beset him in the doing of it, have already been adverted to: and by 4th October, *i.e.,* eight days prior to the arrival of Governor Gawler in South Australia, Kingston was able to report to J. H. Fisher that "he confidently anticipated the completion of all sections at the time selected in districts "A" and "B" during the week ending on 27th October." (¹¹)

But Kingston had always aspired to the Surveyor-Generalship, and he now thought that he had good reason to believe that the coveted office was at last well within his reach: in the main, perhaps, because of the energy and zeal of which he had recently shown proof, coupled with the arrival of a Governor who knew not Joseph: and accordingly adopting "rush" tactics he made bold application for the office within ten days of the Governor's arrival in the colony. But Governor Gawler was far too level-headed ever to form important decisions on the spur of the moment, and had no doubt given careful consideration as to what had best be done for efficient leadership in the surveys of the colony, *prior to Kingston's application for the same.* In England he had been made acquainted with the *Adelphi* views of Colonel Light, and since his arrival in the colony he had been able to gauge the strength of the latter's hold on the respect and affections of the great majority of the colonists. Gawler's subsequent actions in the matter may best be told in his own words: "In my first interview with Colonel Light"—about ten days after his arrival in the colony (¹²)—"I expressed in strong terms the good feelings of the Commissioners towards him and my desire to re-instate him in office. I pointed out

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(⁹) See Appendix V. at end of volume.
(¹⁰) Governor Gawler to Lord Glenelg, 26th October, 1838.
(¹¹) G. S. Kingston to J. H. Fisher, 4th October, 1838.
(¹²) *South Australian Gazette and Colonial Register,* 9th March, 1839, page 2, col. 4.

at the same time that his expressions with regard to Mr. Rowland Hill, in a letter written to Mr. Fisher, formed a hindrance to the accomplishment of my wishes . . . these expressions as referring to strictly official acts of Mr. Rowland Hill, apply not to him but to the Commissioners, and it is evidently impossible to pass by such terms from one under authority against the superiors of his Department, without at least receiving an expression of regret. He told me that 'he did not wish to return to office,' and neither he nor his friends had taken any steps to forward his re-appointment: excepting that the latter—I was told—got up an address which document however was never presented to me. (13) To Colonel Light's friends I spoke in the same terms as to him; and gave to all, I conceive, as fair an opportunity as I was justified in giving, of meeting me half way in my declared desires of bringing about his re-instalment. Towards Colonel Light himself from the first days of my arrival in the colony I have exhibited strongly the friendly and kindly feelings which are due to an old and distinguished officer. This assertion could be proved if necessary by some striking facts. My opinion is that neither Colonel Light, nor his intimate friends desired that he should be re-appointed. *His health, I have reason to be sure, is and then was altogether unequal to the situation.*"

Mrs George Gawler, wife of Governor Gawler.
[*Plate* 46] (*Courtesy Archives.*)

"Mr. Kingston was working diligently, but he had the assistance of only one other surveyor; and there was no prospect whatever of reconciling him with those who had resigned with Colonel Light. It would have been, I conceive, under the particular circumstances of the case, very unreasonable and unwise to have promoted him to the office of Surveyor-General: when therefore he pressed upon me his resignation, because I would not give him the promotion, I did not hesitate to accept it." . . . "In the meantime I have been myself performing the duties of Surveyor-General. (14) It is not to be expected that with my other most pressing occupations the surveys should have gone on as efficiently as under one whose whole time and mind could have been devoted to the work:" "but I have reason to hope that the Commissioners will be gratified by what has been accomplished in the short space of time I have been here At the least an efficient survey establishment has been formed." (15)

Following on Kingston's resignation, Colonel Gawler took immediate steps to re-organise the Survey Department: on 29th October, five of Colonel Light's former assistants, who had resigned with him rather than work under the

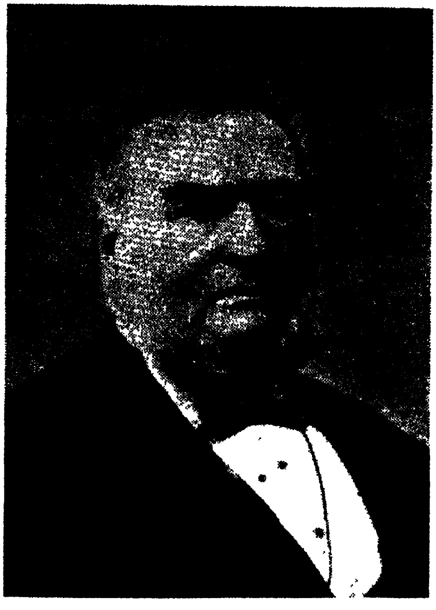
(13) *Southern Australian*, 27th November, 1838, page 3, col. 3.

(14) "They"—the Gawler's relatives in England—"would not I am sure for a moment judge harshly of us"—for neglect of private correspondence—"if they could witness the press of public business, besides which the Governor is Acting Surveyor General, and every other general in the colony." Mrs. George Gawler to her sister, Mary Ann Cox, 7th December, 1838, in *A Book of South Australian Women in the First Hundred Years.*

(15) Governor Gawler to Rowland Hill, 14th March, 1839.

direction of Kingston, were re-instated as Assistant Surveyors; (16) and of these, pending the appointment of a Surveyor-General, George Ormsby was given the superintendence of the survey on 10th November. (17) As soon as Gawler had ascertained that Colonel Light either could not, or would not accept office, he offered the position of Surveyor-General to Captain Charles Sturt, the discoverer of the Murray and incidentally of South Australia. This position was accepted by Sturt who was subsequently gazetted Surveyor-General and a member of the Council on 9th February, 1839, "in the room of William Light, resigned": (18) he did not however take up his duties until 3rd April, 1839. (19) Later on five additional surveyors were induced to leave New South Wales and join the South Australian Survey Department: (20) and later on still, when owing to the continued ill-health of Colonel Light, the firm of Light, Finniss & Co. went into voluntary liquidation, the position of Deputy Surveyor-General was offered to, and accepted by B. T. Finniss. (21) Occasionally, too, tenders for surveys were advertised and taken up by private surveyors, as was the case around Cape Jervis, and partially around Yankalillah and Rapid Bay. (22)

It was a cardinal principle in the Land Regulations of the Colonisation Commissioners that "the surveys of public lands should, as far as possible, be carried so much in advance of settled districts, that there shall at all times be an extent of land surveyed and open to purchase exceeding the wants of the colonists": and it was Colonel Light's unfortunate inability to give adequate effect to this principle during Hindmarsh's term of office that led to so much heart burning in the colony, and eventually to Light's regrettable resignation. These facts were always steadily borne in mind by Governor Gawler, and with a soundly re-organised Survey Department, he made it his minimum aim to meet all the colonists' land requirements at the earliest possible moment. In this latter connection he had to satisfy the requirements of three different classes of land purchasers, namely:—



B. T. Finniss (1807-1893), Deputy Surveyor-General.

[*Plate 47.*] (*Courtesy Archives.*)

(*a*) Those who had purchased Preliminary Land Orders in England—437 in number, each of 134 acres—and who had the right of priority of choice throughout the province over all other subsequent purchasers; and who, as we have already seen even claimed the right to suspend all appropriation of land until all their least requirements had been met to their satisfaction. These

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(16) *The Southern Australian*, 10th November, 1838, page 4, col. 3.

(17) *The South Australian Gazette and Colonial Register*, 10th November, 1838, page 1, col. 2.

(18) *The South Australian Gazette and Colonial Register*, 9th February, 1839, page 1, col. 1.

(19) *The South Australian Gazette and Colonial Register*, 13th April, 1839, page, col. 1.

(20) Governor Gawler to Rowland Hill, 14th March, 1839.

(21) *South Australian Register*, 31st August, 1839, page 3, col. 3.

(22) *South Australian Gazette and Colonial Register*, 26th January, 1839, page 1, col. 3.

Preliminary Purchasers were the cause of much trouble to J. H. Fisher, and equally so to Governor Gawler: of some of the former the latter wrote that they continually frustrated his attempts to induce colonists to settle their differences amicably. "The conduct of these persons from my first arrival in the colony has been to seek and receive liberal advantages from me, but, in return, to press upon me the most narrow and selfish pretensions, whilst their organ—the *Southern Australian*—. . . holds them up to the colonists as the most public spirited men in the province. (23)

(*b*) Subsequent purchasers of 80-acre Land Orders and

(*c*) Purchasers of "*Special Surveys*" varying in area from 4,000 acres and upwards, selected from out of a compact area of 15,000 acres. These "Special Surveys" which represented a striking feature in the history of South Australian Land settlement, were almost entirely confined to Gawler's period of office, and will be examined in detail in a later chapter.

On the 18th July, 1839, Gawler was able to report "that by the great exertions of the Department the extent of land thrown open to tender and Land Orders of 80-acre sections had practically exceeded the demand." (24) And again, on the 15th October, 1839: "As regards 80-acre Land Orders and tenders, the supply has been for several months in advance of the demand: and as regards Preliminary Sections, so large a proportion had been supplied; and so satisfied are the holders of the remainder of the advantages of a delay in selection, until the country be thoroughly known, that for several months not the slightest dissatisfaction has been expressed. (25)

(23) Governor Gawler to Rowland Hill, 16th February, 1839.
(24) Governor Gawler to Rowland Hill, 18th July, 1839.
(25) Governor Gawler to Colonel Torrens, 15th October, 1839.

APPENDIX V.

CONDITIONS OF SOUTH AUSTRALIA IN 1838.

Extracts from Governor Gawler's despatch of the 22nd *January,* 1839, *to the Secretary of State for the Colonies.*

"These affairs"—*i.e.*, the general affairs of the Province—"at this moment are involved in most aggravated and complicated difficulties. I do not wish to make my situation appear worse than it is, when I say I do not think it possible that a Governor of a colony could be placed in more trying circumstances than mine. On arriving here about three months ago I found the Public Offices with scarcely a pretension to system—every man did as he would, and got as he could. There were scarcely any records of past proceedings, of public accounts, or of issue of stores. The non-fulfilment of one of the leading principles on which the regulations made for the disposal of land were based, that 'the survey should be in advance of the demand' had produced a number of complicated questions with regard to leasing of pasturage, order of selection and so forth, which the letter of the law as it stood could not rectify. Sections for occupation were only laid out in the plain about Adelaide, in a district not exceeding a square of ten miles on the outside. Seven other districts of about the same dimensions remained to be marked out for the choice of Preliminary Purchasers, who will occupy the greater part of the good land in them. The Survey Department was reduced to the Deputy Surveyor-General, one draughtsman, and one assistant-surveyor; its instruments to a great extent unserviceable and its office with scarcely any maps of the country; and totally without system, records, or regulations. Scarcely any settlers in the country; no tillage; very little sheep or cattle pasturing, and this only by a few enterprising men risking their chance as 'squatters.' The population shut up in Adelaide existing principally upon the unhealthy and uncertain profits of land jobbing. Capital flowing out for necessaries of life to Sydney and Van Diemen's Land, almost as fast as it was brought in by passengers from England. The colonial finances in a state of thorough confusion and defalcation—up to this day my written orders given on the 18th October, 1838, have not obtained for me from the Treasurer abstracts of receipt and expenditure for the first three quarters of the year 1838."

"Almost all that I have been able to recover definitely of the finances of this period is that the whole regulated expenditure for the year—£12,000—was drawn and expended in the first quarter. The proceedings of the Commission appointed to enquire into the state of the Accounts and Stores have been stopped for the want of documents. This Commission has examined and passed, and I, considering the serious inconvenience which prevails from the want of money have ordered to be paid outstanding claims to the amount of £6,321 2s. 4d.; others to the amount of £2,000 remain for reference to the Commissioners. The establishment of Public Officers was much too low for duties to be properly performed; and their salaries so small in proportion to the high rates of wages and provisions that they culd not live upon them. I am credibly informed that the Acting-Judge, upon the half salary of his office, lives without a servant and boards with the Clerk of the Court. New public buildings of every kind are wanting. At the gaol built for eight prisoners, there are on the average thirty, generally sailors or runaway convicts; since my arrival six prisoners have escaped, and in consequence it has been necessary to increase very much the police force in order to prevent injurious effects by a continual chain of sentries. My own household and office accommodations are of the most straitened and inconvenient description."

"The Colonial revenue is as yet insignificant; and though I am most willing loyally to amend this deficiency, and am proceeding to do so, yet in the present state of the colony, taxes can only be imposed with the greatest circumspection; and for some time to come will probably do little more than defray the expenses of collecting them."

"This, my lord, is certainly not a complete, and I can conscientiously affirm to the best of my judgment, not an overdrawn statement of the difficulties in which I found the colony. If to these your lordship would add those serious dangers which must accompany a new population of persons unrestrained by mutual acquaintance, or old habits and association, flowing in with what may be called 'fearful rapidity' upon a colony which stands alone at the breadth of the world from the only point of assistance or reference, I think that your lordship will justify the persuasion that is on my mind, that of human agency nothing but a strong and steady hand at the helm of Government can guide the Colony through its early dangers. I do not venture to judge how far mine may be strong or steady; but it certainly could exercise infinitely less of strength or steadiness than it does if it were bound with a chain of iron to a party holding novel and speculative principles, of which I can gather no legal authority; ruthless and inconsiderate in pressing them, and setting them paramount to every other consideration. A party too of which the members have not been sparing towards me personally of public insult and misrepresentation."*

GEORGE GAWLER, Governor.

* The closing remarks in the last paragraph of this letter represent a reference to the public attacks of Charles Mann and his satellites upon Governor Gawler.

(*To be continued.*)

Wheat Growing in the Mallee

[By R. L. Griffiths, D.D.A., District Agricultural Adviser.]

Continuation of a Record of the Chandos District Wheat Crop Competition for 13 Seasons, 1924 to 1936.

(*Continued from page* 934.)

Rotation of Crops.

One of the most important features in the management of any cereal growing farm is the type of rotation followed, and on mallee land this increases in importance as the land gets older. There is usually a tendency to overcrop during the years of development, partly because most mallee farmers begin with only small capital, and partly because of a mistaken idea that several crops in succession are necessary to destroy the mallee shoots, whereas in fact a rotation system which includes fallow from the start is much more effective. The land in its virgin state lacks humus, and successive crops with the burning of straw quickly bring the sandy country to a state where drift begins, and steadily gets worse as the farm gets older. These mallee soils will not stand heavy cropping, and much of the drift is due to exploitation of the soil. In the first Chandos Competition, held in 1924, the report of the Judge, Mr. Spafford, stated:—"The time soon arrives when these sandy soils show signs of being over-cropped, and they drift badly. . . . This latter stage has been reached with much of the sandy land of the county of Chandos, and the time has arrived when owners of such land should wake up to the fact . . . . Profitable handling of sandy soils, when rainfall is fair, can therefore be summed up as 'Crop seldom and stock much'."

Succeeding years have proved the truth of this statement, but in spite of the warning of increasing drift, although many farmers are on reasonable rotation methods, some still badly overcrop the land.

The details obtained from the competition entries include the history of each field for the previous five years. The year immediately preceding, of course, is almost always fallow, and has not been included in the lists showing the rotations. From the other four years a very fair guide is obtained concerning the rotation practices, although it is recognised that sometimes it may be that four years do not show a complete rotation system. But the lists will be sufficiently accurate to give a good general idea of rotation practices, which have been as follows:—

CHANDOS CROP COMPETITION.

Crop Rotations.

(All except 23 crops have been sown on fallowed land.)

Type of General Rotation.

Year.	Two-year Rotations.	Three-year Rotations.	Four-year and Longer Rotations.
1924	1	23	34
1925	2	19	26
1926	—	25	34
1927	—	27	39
1928	2	54	64
1929	6	34	41
1930	3	39	24
1931	6	42	12
1932	6	36	3
1933	7	22	10
1934	3	28	8
1935	3	30	25
1936	4	14	7
Totals	43	393	327
Percentage	6%	51%	43%

DETAILS OF ROTATION CROPS, EXCLUDING FALLOW IMMEDIATELY PRECEDING COMPETITION CROP.

Year.	Fallow.	Wheat.	Oats.	Barley.	Pasture.	Percentage of Wheat to Total of all other Crops and Pastures.
						%
1924	31	53	47	1	82	41
1925	24	49	41	—	55	51
1926	40	54	47	—	83	41
1927	28	48	46	3	76	38
1928	59	92	83	5	131	40
1929	62	71	57	2	108	43
1930	53	67	54	2	82	48
1931	63	87	42	3	42	100
1932	49	66	35	2	32	96
1933	32	46	27	—	28	84
1934	35	48	35	4	32	68
1935	51	62	42	—	70	55
1936	23	32	15	—	29	73
Total	550	775	571	22	850	
Percentage	20%	28%	20%	1%	31%	

The upper list shows that, from 1924 to 1929, each year more of the farmers were using a long rotation of four years or over than a three-course system of fallow—wheat—second crop or pasture, the aggregates being 238 on long rotations, 182 on three-year systems, and 11 on a short two-year fallow-wheat course.

From 1930 the position has been very different; during none of these years has the number of long rotations exceeded the shorter ones, the aggregates being, long rotations 89, three-year rotations 211, two-year rotations 32. There is something seriously wrong in Chandos when rotations are getting shorter instead of longer. The two-year rotation is quite impossible, of course; there is no area in Australia on which a system of fallow-wheat rotation could continue permanently, and on most mallee land it could be practised for only a very short time before the land showed signs of sterility.

The shortening of rotations is shown even more clearly by the lower list, which gives exact details of cropping each year, with the percentage of wheat crops compared to all other crops and pastures. It can be seen that until 1930 the percentage of wheat crops each year was only half or less than half that of the other crops and pastures, which makes the average rotation, when fallow precedes the wheat, a four-year one or longer.

Since that time the percentage of wheat to other crops and pastures has never been as low as 50 per cent., and in two years was 100 per cent. and 96 per cent. respectively, which narrows the total rotation to a three-course one.

There must be a reason for this, and it is not hard to find, being chiefly that because of low rainfall years, yields were lighter than usual, and because of low wheat prices farm returns were much below normal, and so farmers tried to make up the deficiency by sowing a larger proportion of their area with wheat. In a period of such financial stringency many were compelled to try any possible means of increasing farm income, and cannot be blamed for it.

Another reason also influencing some of the farmers was that they found take-all infestation in wheat crops was much worse after pasture years, where pastures consisted chiefly of barley grass which certainly carries and increases the disease. To combat the take-all they sowed oats—chiefly for grazing—during the year following the wheat crop, and then fallowed the land again for wheat.

It is hoped, however, that all of these farmers recognise that they have been over-cropping, and when times become normal, and barley grass is gradually replaced by other grasses and clovers; that they will widen rotations as far as possible to correct the trouble.

One satisfactory feature is that oats are commonly grown, the comparison of oat crops to wheat crops being 74 per cent. Many of these oat crops also were used as grazing, and only subsequently cut or reaped when the season provided sufficient other spring feed for livestock. Oats provide an excellent rotation crop to follow wheat, being not susceptible to rootrot diseases, and there is no fault to be found with the rotations in this respect.

Barley is not a crop of any importance in this district, as can be seen from the detailed list. The prevalence of take-all, to which barley as well as wheat is susceptible, has prevented it being much grown to date, although it is likely to be used, more particularly on the sandy land, in the future.

The chief fault is in the amount of pasture, which is little more than the wheat cropping. The keeping of livestock, sheep in particular, is essential on all cereal growing farms, and where rainfalls are only moderate, and much of the soil is sandy, they have an increased importance.

This is the way in which Chandos farmers should alter their methods:—Introducing more pasture years into the rotation; improving pastures with Wimmera rye grass; and by adequate super dressings to encourage clover growth, so that more livestock may be carried, and the land allowed to recover from the period when it has been overcropped with wheat.

Trueness to Type of Varieties.

Owing to the demand for seed wheat reasonably true to type, in 1927, judges commenced to recommend for seed purposes such competition crops as were fit for this purpose. The number of crops from the Chandos competition so recommended each year has been:—

1928	26	1931	10	1934	11
1929	18	1932	7	1935	15
1930	15	1933	11	1936	5

A total of 118 crops, or 20 per cent. of all entries. Another 10 per cent. could have been recommended, being true to type, but were spoilt by impurities, chiefly barley, but occasionally drake seed or ball smut. It is not much use keeping varieties true if their value as seed is spoilt by weeds or controllable diseases.

There is undoubted advantage in keeping varieties true to type, as the whole crop then matures evenly, at the same time, and there is less harvesting difficulty. Also a true to type variety, particularly if from recently selected seed, is likely to grow stronger plants than one showing variation or admixture. The extra value of a crop as seed wheat, also, of course, is considerable.

Many varieties, particularly the newer ones, often showed some variation, and it was customary to reduce points for trueness less for these variations than for definite mixtures, as the variation is not entirely under the farmer's control. The remedy in both cases, of course, is the same, the purchase of seed, not necessarily a large quantity, from a reputable source of supply, and the eventual discarding of the old type.

Admixtures mostly come from—

(1) Feeding horses at seeding time with wheaten hay or chaff containing well developed grain.

(2) Carelessness in handling machinery which handles the wheat, *i.e.*, graders, drills, and harvesters.

(3) Bags of seed wheat of different varieties becoming mixed through lack of branding.

Farmers rarely have time to clean any portion of their crops from admixtures or impurities for seed purposes, and so the best remedy is the purchase of fresh seed, much easier now that in addition to the wheat grown at agricultural colleges and pure seed farms so many competition crops are recommended for seed and the lists given wide publicity.

The improvement in trueness to type with crops after the farmer has got into the habit of crop competitions is most noticeable.

The average number of points given for trueness to type each year of the Chandos competition has been computed, and is as follows:—

1924	12.41	1931	13.48
1925	13.00	1932	13.82
1926	12.68	1933	13.93
1927	13.12	1934	14.04
1928	13.48	1935	14.06
1929	13.66	1936	14.16
1930	13.60		

In 1924, 1925, and 1926, only 10 points were alloted as a maximum for trueness to type and so 50 per cent. has been added to these averages to make these years comparable to the remainder, when 15 points were the maximum.

The improvement is most striking, and is an excellent testimonial to the value of crop competitions.

Control of Weeds.

Next to the apparent yield, the degree of weed control is the most important feature in the judging of crop competitions. In the Chandos district certain weeds are most troublesome, these being barley, wild mustard, wild oats, and cape dandelion, while others which occasionally appear are sheep weed, sterile brome grass, barley grass, poppy, wireweed, melilotus, and drake.

Barley is seen far too often in these crops, and has not been controlled so well here as in other parts of the Murray mallee. Each year the reports have commented on barley in the crops, but there has been little improvement. Even in 1936, all of the entries except six showed some barley plants.

There are two necessary means of control, both comparatively easy:—

(1) Effective grading of seed wheat, to remove all barley grain.
(2) The feeding of horse teams just before and during seeding, with hay or chaff which is entirely free of barley.

Wild Mustard is very common, while *Wild Oats* is inclined to increase as the land gets older. These are both difficult weeds to control, as some of the seed remains ungerminated in the soil for long periods, and thus provides successive germinations after each rain. They can be best controlled by early fallow, complete checking of weed growth on fallow by sheep or cultivation, and shallow autumn working and seeding to avoid bringing up ungerminated seed from the soil underlayers.

Cape Dandelion is a troublesome weed, difficult to manage if autumn months are wet, as established plants are very hard to kill. It germinates freely, and can be destroyed easily when only a seedling, so implements which will cultivate all of the fallow quickly after autumn rains are needed. For this purpose the harrow fitted with cultivator points is excellent.

Control of Diseases.

To show the seasonal incidence of the common wheat diseases a chart has been prepared giving brief comments from the Chandos crop competition reports on each of them each season. It is seen that all of them have seasonal variations and that during more recent years some have become less serious.

TAKE-ALL.

Under this name is included all of the root-rots, the chief one in the Chandos competition being haydie. In some seasons this has been very serious, but for the last four years has caused little damage, which may be due to the seasons, or also partly to better means of control, and the fact that as land gets older it appears to be less susceptible to these diseases. Certainly, during the whole period of the competition there has been less take-all on the older farms at Pinnaroo and Lameroo than on those cleared more recently in other parts; and much less on heavy soil than on sand.

It is always worse after barley grass pastures, this grass being very susceptible to it, and the replacing of barley grass by resistant species such as sown Wimmera rye grass, or naturally by Mediterranean grass, which is now becoming very common, together with the encouragement of clover growth on pastures by the use of more super, will prove the best means of control.

Early fallow, kept clean and well consolidated, combined with farm practices which assist in the growing of strong wheat plants, will all help to reduce the amount of rootrot diseases.

FLAG SMUT.

It was thought at one time that this would develop into the most serious disease of the mallee, as it could be found to some extent in all crops and was controlled chiefly by rotation and cultivation practices. Now a better means has been found in resistant varieties, the chief of which in the Chandos area have been Nabawa and Sword. A greater area of resistant crops means less flag smut spores for dispersal over the country, and so reduced infestation in all wheat crops. Although there is seasonal variation with flag smut infestation, there has been considerably less of it, as will be seen from the chart during recent years.

LOOSE SMUT.

This disease rarely causes much damage in the Murray Mallee district. Only in occasional years are the susceptible varieties much affected, and farmers do not need to trouble much about it, beyond obtaining a clean supply of seed if it is noticeably increasing in any particular crop.

BALL SMUT.

This disease is entirely controllable by the farmer, and so when it appears in competition crops more points are deducted than for any other. The chart shows that it is not being entirely controlled. There is definite seasonal variation in the susceptibility of plants to the development of this disease, but this does not excuse farmers who have been careless in their pickling methods. Thus in the Chandos competition of 1935 there were 12 crops sown with unpickled seed, and eight crops showing ball smut.

CHANDOS CROP COMPETITION.

INCIDENCE OF WHEAT CROP DISEASES.

Year.	Take-all.	Flag Smut.	Loose Smut.	Ball Smut.	Rust.
1924	Serious	Much	Little	Bad (15 crops)	Much on flag
1925	Serious	Much	Bad in some crops	Bad (21 crops)	None
1926	Considerable damage	Very common	Bad in some crops	Very little (6 crops)	None
1927	Little damage	Little damage	Very little	Well controlled	None
1928	Rather prevalent	Well controlled	Very little damage	Very little (1 crop)	Much on flag, slight damage
1929	Haydie very prevalent	Some damage	More than usual	Bad (17 crops)	None
1930	Very serious	Many crops slightly affected	Very little damage	Fairly well controlled (7 crops)	Appreciable damage in some cases
1931	Less than usual	Not serious	Not serious	Well controlled (5 crops)	Very little
1932	Worse than usual	Many crops slightly affected	Some crops slightly affected	Well controlled (4 crops)	Heavy infestation late in season, little damage
1933	Very little damage	Very little	Little damage	Fairly well controlled (6 crops)	None
1934	Almost harmless	Very little	Very little	Well controlled (2 crops)	Some on flag, no appreciable damage
1935	Yields not affected	Some crops very slightly affected	Some crops very slightly affected	Rather bad (8 crops)	None
1936	Not troublesome	Very little	Very little damage	Fairly well controlled (4 crops)	None

It happens quite often that, in examining 50 acres of competition crop, one or two smutted heads are seen, not enough to call the crop diseased, but quite sufficient to spread the trouble next year, unless pickling is effectively done.

Ball smut may cause much trouble in the future, as it has done in the past, unless pickling of seed wheat is well done.

Dry pickling is the standard practice, and is quite effective provided sufficient powder is used to cover the seed completely and provided the pickling machine is such that all of the seed is evenly covered.

RUST.

The seasonal variation of rust infestation is plainly shown by the chart. In only one year of the 13—1930—was any serious harm done by rust, though there were slight infestations, chiefly on the flag, in 1924, 1928, 1932, and 1934.

The farmer has no control over rust beyond avoiding those wheat varieties which are most susceptible, but it is evident that in this district it need not be feared very much.

No attempt has been made in this article to deal completely with all of the various phases of wheat growing, the objective being to place on record the lessons learned during 13 years from the Chandos Wheat Crop Competition, and it is hoped that these will prove of value to many farmers not only in the Chandos area, but also those whose conditions of climate and soil are at all similar to those of the Chandos district.

Propagating the Oleander.

At the Booleroo Centre Conference the Willowie Branch asked "How to get the Oleander to grow."

Reply—J. C. Newsham (England) says: The common Oleander, like other species, although ornamental both in foliage and flower, is extremely poisonous. Propagation is effected by inserting cuttings singly in thumb-pots and placing these in a close, warm frame, or they may be rooted in bottles of water, into which a few lumps of charcoal have been placed. When rooted, they should be carefully potted and kept warm until established.

The question was also referred to Mr. Greaves (Director of the Adelaide Botanic Garden) who said that the method suggested above was quite satisfactory, but extreme care was necessary in transplanting, because the roots that the cuttings developed when placed in water were very fragile and would break off unless handled very gently. Mr. Greaves preferred to take off three or four of the side shoots, with a heel, that grew out from the stem immediately below the flower. These should be placed in a box containing pure sand, which must be kept moist and in a warm place.

With regard to the poisonous properties of Oleander, Mr. R. H. F. Macindoe (Deputy Chief Veterinary Officer) states that it is very poisonous to stock and he quotes the following reference from "The Toxiology of Plants in South Africa" (Steyn):—"*Nerium Oleander.* L.—Common names—English Oleander, Ceylon rose, South Sea rose, rose bay, dog bane.

Toxicity of the Plant.—The poisonous properties of the plant have been known for centuries.

The first case of poisoning in stock (horse) in South Africa was recorded in 1903.

Meat roasted on skewers of Oleander wood has been responsible for death of soldiers.

Fowls, ducks, geese, goats, horses, and cattle and sheep have been poisoned.

Both the white and the pink varieties of Oleander are poisonous, a single growing top of the plant proving fatal to horses and cattle. The leaves and bark are poisonous, green or dry."

Processing of Prunes

[Report submitted by the Fruit Processing Committee.]

Varieties of Plums.

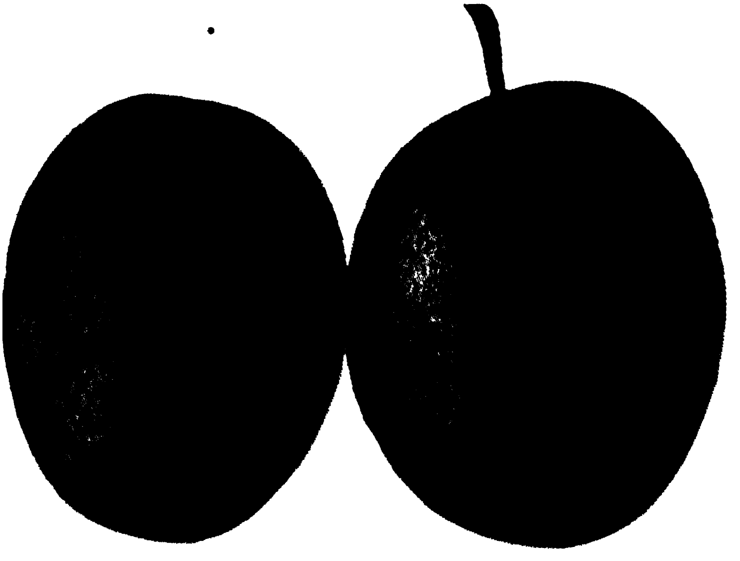
While d'Agen and Robe de Sargeant are recognised varieties for prune production, others are known to produce a satisfactory prune, while some are definitely not suitable. From this point of view plums may be divided into two classes:—

Suitable for drying: d'Agen, Robe de Sargeant, Splendour, French, Fellemberg (Italian), Imperial and Sugar.

Definitely unsuitable for drying: Golden Drop, Angelina Burdett, President, Giant, and Grand Duke.

Cultural Methods.

Emphasis should be laid on the fact that cultural methods play an important part in prune quality. Although cultural operations are not directly connected with processing, they obviously have a very important bearing on the quality of fresh fruit, and this is a first essential in the production of high-grade prunes. Particular attention should therefore be paid to pruning, thinning, &c., and to such general cultural methods as are necessary to ensure first-class fruit. Under present cultural conditions in many districts it has been noted that the majority of the plums at harvest are small and light, and that there is a marked variation in size, colour, and sugar content at state of maturity of the plums on each tree. A uniformly high-quality pack is not possible under these conditions.



Effect of proper lye dipping on the skins of prunes.
[From *University of California Bulletin* No. 388.

Elimination of Unsuitable Fruit in the Field.

The first plums to ripen are, as a rule, somewhat deficient in sugar. This premature drop of plums that are coloured but are not matured should be cleared from beneath the trees to prevent contamination of mature fruit falling later, and should be disposed of immediately they have been processed.

Apart from these first-ripening plums, fresh fruit, ready for drying, may be divided into three classes, viz., wilted or fruit which ripens and wilts on the tree and then drops; full-ripe which has not wilted; and unripe. It has been definitely established that for most varieties the first class produces the highest quality prune and, further, that there is a fairly high proportion of unripe fruit in a crop which, if not separated, will materially reduce the general quality of the pack.

Plums should therefore be allowed to ripen and drop from the tree, and these should be collected every two or three days. Any shaking of the branches should be very gently performed to avoid the falling of immature plums. In order to produce a pack of the highest quality it is essential to grade the plums at harvest into two classes, wilted and full-ripe, which should be kept separate, and to discard all other fruit. This initial grading must be done if high quality, with resultant higher prices, is to be obtained.

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*An interstate committee with the following personnel:—Messrs. C. G. Savage (N.S.W. Department of Agriculture), W. R. Jewell and D. G. Quinn (Vic. Department of Agriculture), A. G. Strickland (S.A. Department of Agriculture), and A. V. Lyon (Council for Scientific and Industrial Research).

Dipping Prior to Drying.

The dipping process is by no means standardised, and the best French prunes are not dipped at all. When dipping is practised, prunes are dipped as soon as possible after gathering, the usual dip being the caustic one containing 1lb. of soda in from 12galls. to 30galls. of water. The correct strength depends on variety, maturity, and climatic conditions, and can be determined only by trial. In fact, there is evidence to suggest that a much weaker dip (1lb. of caustic soda in 50galls. of water) will give satisfactory results, provided the dip is kept boiling continuously. A constantly boiling dip is essential, and it is generally agreed that it should very slightly crack the skin of most of the prunes. Cracking of the skin should be barely noticeable as more pronounced cracking is undesirable. The dip is momentary, and fruit should be spread on trays at once. Dips other than the caustic dip have been tried, and it would appear that, within limits, the nature of the dip is relatively unimportant.

Drying.

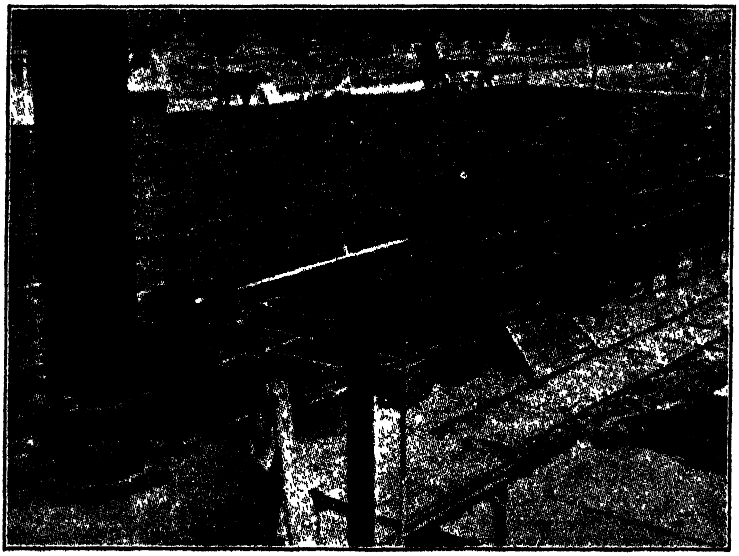
If the weather be very hot, trays should first be stacked to prevent "case hardening" and "boiling" of the fruit with the loss of juice, after which they are generally exposed to the sun except in very hot periods. Prunes are also dried on single-tier, wirenetting racks, in which case they dry more slowly, but are not liable to the same degree of damage by rain. Information is lacking as to the optimum moisture content desirable at the completion of the drying period, but the prune must be sufficiently dry to store indefinitely in bulk, and to allow the addition of further moisture during processing. A slightly harsh condition at this stage is safest if deterioration on storage of the desirable blue-black colour is to be prevented. This harsh condition is undesirable in fruit for sale, but is only temporary in the case of fruit designed for further processing and moistening.

Sweating.

When dry, prunes are suitably stored in bulk for five or six weeks while slight fermentation takes place, and the product assumes a uniform moisture content. Care should be taken to turn the fruit from time to time. This can be conveniently carried out by tipping the fruit from one box to another.

Factory Processing.

Apart from size grading and hand picking of faulty fruit, it should be an invari-



Preliminary sun-drying of prunes before transferring to a dehydrator, the chimney of which can be seen in the foreground.

[From *Journal of Agriculture*, Victoria.

able practice to process dried prunes with a view to increasing the moisture content and producing a moist pack. This may be done by steaming or dipping. It is probably undesirable to add to the dip bath many of the concoctions that are now employed, but certain simple additions may be of benefit. When dipping, the prunes (in a wire basket) should be totally submerged in boiling water. The period of dipping depends on the condition of the dried prunes, and may extend to three minutes with very dry fruit. The dipped prunes are thickly spread on drying trays or sweat boxes. As soon as the surface of the prunes is dry, they should be packed.

From the information available, it would appear that the moisture content of the processed prune should range from 20 per cent. to 25 per cent. Moulds are liable to develop with moisture contents greater than 25 per cent. Recently processed prunes are more attractive than those which have been processed for some time, so that it is desirable that dry prunes should be processed progressively according to market requirements. After prolonged storage, prunes which have become unattractive may be re-processed with advantage.

In order to produce a uniform pack by a standard procedure it is desirable to process prunes at one central factory rather than at a large number of small centres

Dessert Prunes.

The foregoing remarks on factory processing refer primarily to boxed prunes. The following procedure for dessert prunes is that recommended by the Director of Fruit Culture, New South Wales Department of Agriculture:—

The prunes, as they come from the sweat after completion of drying, should be thoroughly graded, only the larger prunes should be processed as dessert prunes (as a rule greater counts than 60/70 should not be used).

The prunes, in dipping baskets, should be thoroughly rinsed in cold water, and then placed in sweat boxes and allowed to "cold sweat" for at least 36 hours. If convenient, sufficient can be dipped to last two or three days' processing as prunes are not harmed by holding them in a moist state for a few days, and possibly may be improved. They should then be exposed direct to steam at a pressure of 5lbs. for a period long enough to render the skin quite tender and the flesh soft. During steaming the prunes should be held in wire dipping baskets or some receptacle that will allow the steam to circulate freely amongst them. The period of steaming necessary will vary with the condition of the prune, and can be determined only by test. From trial to date the variation may be from 10 to 25 minutes. The length of period necessary can be arrived at by testing several prunes between the front teeth at intervals until the required tenderness of skin is reached. The skin should be sufficiently tender to offer no appreciable resistance to the teeth when bitten. When steaming is completed the prunes should be packed whilst hot in lacquered cans. The skin of the steamed prune will toughen appreciably if the fruit is allowed to cool for more than 15 minutes.

When packed, the cans are exhausted, sealed, and sterilised. Ten minutes exhausting with vents open, partially submerged in a boiling bath, and 25 minutes sterilising with vents closed, totally submerged in boiling bath, was found satisfactory for cans 5in. by 4in. overall packed with 29ozs. of steamed prunes. Fifteen minutes exhausting with vents open, partially submerged in boiling bath, and 30 minutes sterilising with vents closed, totally submerged in boiling bath, was found satisfactory for cans 7in. by 6½in. overall, packed with 6¼lbs. steamed prunes.

Where facilities for steaming under pressure are not available, the prunes may, after cold wet sweating, be dipped in boiling water to soften the skins and flesh. The length of the period of dipping must be judged in a similar manner as for steaming. Generally, however, dipping cannot be extended much beyond 12 minutes, as the prunes commence to break up. When dipping is completed the prunes are packed while still quite hot, and the cans exhausted and sterilised as already described.

Prunes cooked in this way have a distinctly different flavour from those cooked by steam, which may suit some palates, but they lack the glossy appearance of the steamed prune, which is apparently preferred by the consumer. Consequently the boiling water dip cannot be considered a satisfactory method commercially.

Tests have shown that processed dessert prunes, when turned out of the can, will remain in satisfactory soft condition for 36 hours, and, if allowed to remain in the open can, for 72 hours. After these periods the skin of the prune toughens appreciably. It can therefore be judged that if the processed prunes are packed in a container that is not airtight, such as a carton, the prunes will need to be consumed within three days of packing. Otherwise the skin of the prunes will become too tough for dessert prunes and the fruit could only be classed as stewing prunes.

Treatment of "Greasy Heel."

The Deputy Chief Veterinary Officer (Mr. R. H. F. Macindoe) has supplied the following reply to a question relating to the treatment for "greasy heel," submitted at the Waikerie Conference:—

Greasy heel is the common name applied to a skin affection behind the pastern, in which is seen an accumulation of debris, with reddening of the skin, which later cracks, and is accompanied by a yellow-coloured discharge, which has very little odour.

Owing to the cracking of the skin, considerable pain may be shown when the animal is moved.

The most common causes of the condition are, accumulation of sweat salts and other debris, washing of the legs and subsequent exposure to wind or air draughts.

It is frequently seen in horses with white legs which are frequently washed, also in horses which have to stand in dirty stables, in which cases the ammonia given off by the urine, in addition to direct contact with manure, will cause the trouble.

Treatment can be placed under two headings:—1. Preventive. 2. Curative.

Owing to the number of factors to which greasy heels are due, preventive measures undertaken will depend on the cause; but probably the main cause is legs remaining wet and exposed to the wind, thus bringing about the condition which is similar to chapped hands in humans.

Therefore, if legs are washed or wet, keep the horse in the stable out of draughts until they dry thoroughly, or the legs may be lightly bandaged, from heel to knee or hock, as the came may be, with strips of bagging.

Where stable floors are deep in manure, this should be removed, and all hollows capable of holding pools of urine should be filled in.

CURATIVE TREATMENT.

In the majority of cases, greasy heels respond to simple treatment. The heels should be thoroughly washed with soft soap and warm water to remove all accumulated scales and debris. Dry thoroughly and carefully, clip away all hair behind the pastern and over the heels.

When this has been done, apply any of the following dressings:—

1. Zinc ointment.
2. Salicylic ointment (5 per cent. strength).
3. A powder composed of—Zinc oxide powder, 4ozs.; Boracic acid, 4ozs.; Tannic acid, ¼ dram. Mix well.

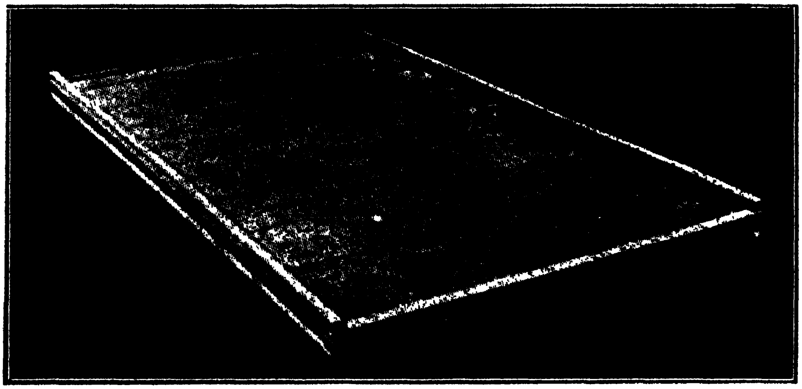
For preference, an oily dressing such as zinc ointment well rubbed in and covered with a light layer of wool and a bandage should be put on the first day. The following day apply the dry dressing under wool and bandage.

Greasy heels should not be washed after the first time, although a bathing with warm water and a little soap at the end of four or five days will do very little harm.

" Moist-Pack " Processing of Dried Apricots

[Prepared by Mr. W. R. Jewell, and issued by the Fruit Processing Committee.]

Whereas a few years ago apricots were packed bone-dry, it has now become practically a universal custom to market a "moist" pack, which is preferred on the overseas market, and which also has become established at home. The production of a satisfactory moist pack apricot involves certain processing problems which have not not yet been solved by all packing sheds, as experience has shown that packers have not been entirely successful in producing a satisfactory product which will retain its colour on storage. Attention is therefore drawn to the following points which have an important bearing on the question, and which must be observed to obtain the best results in moist packing.



Drying tray of popular size—4ft. x 3ft.

[From *Agricultural Gazette*, N.S.W.

Grading.

Grading in the packing shed is invariably required if an attractive and uniform product is to be obtained. Reports from overseas markets stress the necessity for more consistent grading both for colour and for size. In addition to size-grading, picking out of faulty pieces by hand seems essential.

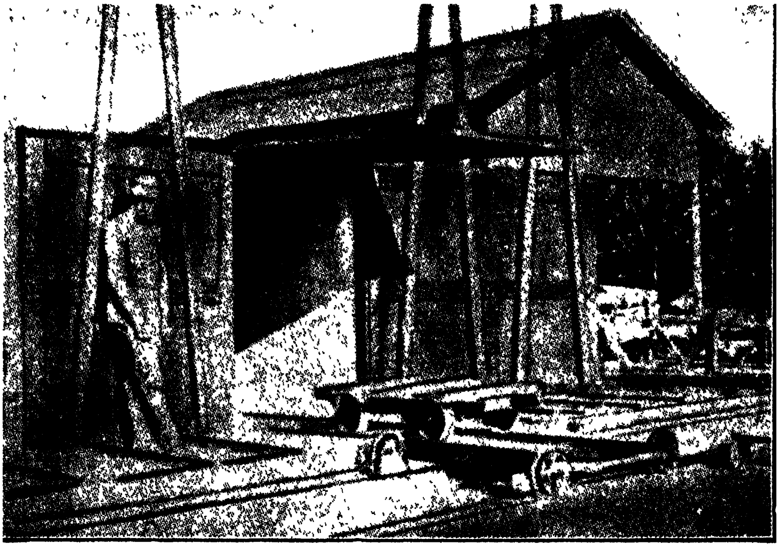
Moistening.

Moistening may be accomplished by immersion in water at 180°C. or by steaming followed by partial drying. The time of immersion or steaming depends on the condition of the apricot, and can be determined only by trial. There is a limit to which the moisture can be raised consistent with successful keeping qualities during export or storage. This limit is from 20 to 25 per cent. of moisture and lower limit should be observed for export fruit. It would appear from this that the determination of moisture in processed fruit should be a regular procedure in a packing shed; it is difficult to see how otherwise the moistening process can be adequately controlled or a uniform product turned out from day to day. At present there is no very rapid method for determining moisture content, but experiments are now under way to ascertain whether the electric moisture meter can be adapted to this purpose.

Sulphur Content.

Undoubtedly the sulphur content is the outstanding factor concerned with the retention of a bright colour in moist pack apricots, which lose sulphur dioxide more quickly than do bone-dry ones. Last season a number of instances of darkened apricots were examined and the sulphur dioxide was invariably about 1 grain per pound or less. There was, in fact, a correlation between degree of darkening and sulphur content. It is, therefore, essential that moist packed apricots, immediately after processing, should contain right up to the limit of 14 grains sulphur dioxide per lb.

In order to ensure that such is the case, two courses are open. Either over-sulphured dry apricots should be selected or re-sulphuring after processing must be employed. In view of the widespread adoption of moist packing, it is obvious that the latter procedure must generally be followed. In either case, it must be apparent that a knowledge of the sulphur content both before and after processing is an absolute essential if a uniform and satisfactory product is to be obtained. Without such knowledge moist packing must be haphazard, with the frequent cases of deterioration and wastage experienced in the past with hit-and-miss methods.



Typical sulphur houses with counterpoised door hinged at top. Note transfer and tray cars.

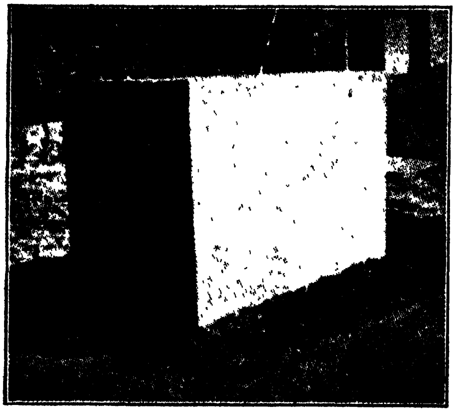
[From *University of California Bulletin* No. 388

A rapid workshop method has been published ("The Australian Dried Fruit News," 26/12/36, page 3), for which technical training is not essential and which appears to be sufficiently accurate and rapid for the purpose in question. Packers are urged to use this, or some other method, to determine the sulphur content of every consignment of apricots prior to treatment and to check the accuracy of the re-sulphuring by a further test after re-sulphuring. It is even desirable to give a further sulphuring if the product does not contain approximately 14 grains per lb. The procedure to be adopted for re-sulphuring cannot as yet be closely prescribed but must be determined by experience, as the amount of sulphur and time of exposure must depend on the sulphur content of the dry apricots and on the extent of moistening. After collecting data for some time correlating sulphur content of dry apricots with moistening and re-sulphuring details, it should be soon possible to lay down a satisfactory procedure suitable for any given type of dry apricots.

Storage.

From statements made earlier, it will be obvious that moist-pack apricots tend to deteriorate relatively quickly, and therefore arrangements should be made for their prompt sale on arrival at destination. Unnecessary storage should be avoided, and in spite of alleged difficulties, it is advisable to moist-pack progressively throughout the year as demand requires, preferably immediately prior to sale. If all apricots are moist-packed at the end of the drying season, wastage must be expected with those subjected to prolonged storage.

Evidence is also available that climatic conditions during storage play an important part. Apricots containing 18 per cent. moisture and 12 grains sulphur dioxide per pound retained their colour and generally attractive appearance when stored for about four months in Melbourne; but a portion of the same box darkened to an unmarketable degree when stored for the same period in the north of Queensland. It would appear that no attempt should be made to store moist-pack apricots under such conditions and that dry-pack apricots are preferable and should be advocated. Storage under dry, well-sheltered conditions gives the best results.



A sulphur box.
[From *Agricultural Gazette*, N.S.W.

Salvaging Darkened Fruit.

At the request of the Australian Dried Fruits Association, an investigation was undertaken to ascertain if badly darkened fruit could be so treated as to restore its original bright colour. After trying a number of treatments it was found (rather contrary to expectations) that immersion in warm water for about 10 minutes, followed immediately by re-sulphuring, restored the bright colour to a remarkable degree, even in the case of very dark fruit. Although the treatment, as would be expected, does not produce as attractive a product as originally, it was sufficient last season to render marketable a very large number of boxes which had been classed as unsaleable owing to the development of a dark colour.

In this treatment, apricots should be classed, as far as possible, according to colour, and apricots of one colour treated separately. An inspection at intervals during sulphuring will indicate what degree of sulphuring is necessary. After treatment, hand-picking will probably be necessary to eliminate the few pieces which have not responded to treatment, and which should be included with the next lot treated.

Conclusion.

Two main points should be stressed. It is definite that a satisfactory and uniform product cannot be obtained without controlling both moisture and sulphur content, which is impossible without some degree of chemical control. In the second place, deterioration of moist-pack apricots must be expected on storage; therefore, process only according to market requirements.

Itch in Horses.

Weavers Agricultural Bureau asks for a cure for "itch" on the legs of horses. The Deputy Chief Inspector of Stock, Mr. R. H. F. Macindoe, B.V.Sc., M.R.C.V.S., says this trouble is due to a minute parasite which is picked up by brushing against long grass and which is also present in hay. Prevention can be carried out by smearing an oily dressing on the legs from the hoof to the knee and the hocks. Add to the oil a little lysol or kerol, such as raw linseed oil, 1 pint; lysol or kerol, 2 tablespoonfuls. Shake well and apply with a body brush, rubbing well in. Repeat for two or three times with intervals of four days. Curative treatment is the same as above.

Wireless Talks

Late Winter in the Orchard: Sprays and Fertilisers

Wireless Talk given by Mr. A. G. Strickland, M.Agr.Sc. (Chief Horticulturist) on 12th July, through Station 5CL.

"If winter comes, can spring be far behind." Many listeners will recognise within these words the title of a novel which achieved success some years ago but let me assure you—this is not going to be a talk about books.

The quotation is made because it crystallises in a sense, thoughts which should be prominent in the minds of growers in deciduous fruits at the present time.

In the course of several weeks, according to variety, deciduous fruit trees will awaken from their winter rest period and in the ensuing weeks, bloom. grow, and produce and mature their fruit. In order to make growth, to set fruit, and to mature such fruit without undue interference from pests and diseases, most deciduous fruit trees will require the careful attention of the fruitgrower during the next few weeks.

Supplementary food for trees in the form of artificial fertilisers, should be applied before buds burst in order that it will be available when the trees most require it, *i.e.*, in the period immediately following commencement of growth. Furthermore, many pests and diseases which only become evident and toublesome during the spring and summer months may be largely prevented by application of correct sprays during late winter and early spring.

Thus, although most kinds of fruit trees are still in their winter sleep, it is time for growers to realise that winter has run portion of its course, that spring is not far away, and that it is time to get busy.

First of all, let us consider the question of soil treatment and application of fertilisers.

Except in special cases, the provident fruitgrower will, at present, have some kind of cover crop growing between the trees in his orchard; it may be a crop of peas, beans, or rye that has been purposely sown in autumn, or it may consist of natural weed growth which has developed through the winter months. In either case, it is essential that this cover of vegetation should be ploughed under before the advance of spring; wherever soil conditions permit, it should be incorporated with the soil three or four weeks before bud-burst. There are two main reasons for this: Firstly, the cover crop which has been ploughed under should be well advanced towards decomposition when the fruit trees bloom, otherwise there is a danger of the trees being deprived of adequate quantities of soil nitrogen—a food which enables the maximum number of blooms to set fruit. Secondly, a standing cover crop of any kind, or standing weeds, remove a tremendous quantity of moisture from the soil, and if not ploughed under early, will often deplete seriously the soil moisture reserve, to the ultimate distress of the fruit trees later in the year.

Artificial fertilisers for spring application have already been ordered by many orchardists, but probably there are also many orchardists who have not made any provision for spring application of fertilisers. In some cases, it must be admitted, that where fruit trees are making normal medium growth, and in consequence producing adequate crops of fruit, the need for artificial fertilisers may not be immediate. On the other hand, there are in South Australia, many semi-starved trees which would appreciate a little extra food, and if given such, would ultimately repay the orchardist for his trouble and expense. Recently, a nutritional survey conducted throughout the Commonwealth showed that many people are depriving themselves of some of the most useful of human foods. A similar survey for fruit trees would undoubtedly show that an astounding proportion of trees are deprived of foods which would benefit them—and fruit trees cannot always help themselves—the orchardist must assist them.

In the time at my disposal, I can only make a few generalised remarks on the use of artificial fertilisers. First of all, the applications (except those intended to stimulate growth of cover crops or weeds during winter) should be applied early in spring—preferably two to three weeks prior to bud burst.

Type of fertiliser and quantity must be decided according to the condition of the individual orchard; trees which are restricted in growth, and which have small pale yellow-green leaves, are most often suffering from nitrogen deficiency, and would benefit from a spring dressing of approximately 3lbs. of sulphate of ammonia per tree. Deficiencies of other minerals, such as potash may occur in certain localities but observation suggests that nitrogen deficiency is the most common deficiency condition shown by deciduous fruit trees in South Australia.

For trees which do not show symptoms of marked deficiency of any one element, balanced fertilisers are recommended. As a general suggestion, the use of 3lbs. per tree of 2:2:1 mixture. 2:2:1 mixture contains phosphoric acid, nitrogen, and potash.

Having decided what fertiliser shall be applied, the next necessity is that of placing such manure where the tree can readily absorb it. There is ample evidence that many fertilisers move downward in the soil to a very limited extent, and if applied at the surface, may be of little direct benefit to trees. After broadcasting the fertiliser, plough it under deeply, and wherever possible, it is even desirable to place spring fertiliser applications at the bottom of a deep furrow.

Before and after busying himself with the matter of application of fertilisers, the grower of deciduous fruits should be planning, or, according to conditions, actively conducting a spraying campaign against certain pests and diseases—unseen at this time of the year, but liable to be very troublesome during the growing season unless tackled before spring and summer.

Green aphis is a pest which in certain seasons causes considerable losses to peach growers. Once established on a tree after commencement of growth, efficient control is impossible, and *now* is the time to conduct precautionary spraying. Eggs of the green aphis are laid in crevices between buds and laterals, cracks, etc., during autumn and early winter, and effective control of this pest depends upon destruction of these eggs before the trees break in spring. It has been estimated that twenty over-wintering green peach aphid eggs, allowed to hatch, will by the fourth generation, *i.e.*, in early summer, have 18 million descendants, even assuming that only half of the progeny born live to maturity.

For green peach aphis, tar distillate sprays have been proved effective egg killers, and peach growers who have been troubled by the pest in past seasons are advised to give trees a thorough wash with tar distillate—1 gallon in 35 gallons of water, within the next week. It is dangerous to apply this spray after about mid-July, and speedy action is necessary.

Whilst on the subject, I would like all interested listeners to note particularly that although tar distillate is an excellent egg killer for eggs of the green peach aphis, it is not thoroughly effective against eggs of red spider. For over-wintering eggs of this pest on apple and other deciduous trees, lime sulphur or red oil—1 gallon in 15 to 20 gallons of water is the best winter wash.

The black cherry aphid may be controlled by winter tar distillate in similar manner to green peach aphis.

Later sprays which should now be the subject of advance planning by growers generally are early spring applications of Bordeaux mixture for control of curl leaf and shothole in peaches and apricots, and in the case of apple and pear growers, "green tip" Bordeaux applications for control of "black spot." In the event of a season favourable to black spot, the grower who does not apply a Bordeaux spray at green tip, *i.e.*, just as the green leaf tips protrude from buds, has very little hope of effectively controlling the disease later in the season. Once again, we see the necessity of directing a spray at something which is for the time being unseen.

One last observation must conclude these remarks. During the past two years, apple leaf hoppers, jassids, or canary flies—whichever name you prefer—have been very troublesome to apple growers, debilitating trees by sucking the sap of leaves, and blemishing fruit to a regrettable degree with their excrement.

Here is another pest which must be attacked in the early stages; include one pint of nicotine sulphate in your early codling moth sprays and deal with first broods, otherwise the control of jassids becomes impossible later in the season.

The orchard operations mentioned in this talk are important, and should not be left for eleventh hour decision. Do not wait until you see your neighbour overhauling his spray pump or handling bags of fertilisers. Plan ahead and attain greater efficiency.

Leaf Mould of Tomatoes

"Leaf mould is one of the commonest diseases of tomatoes grown under glass in other parts of the world" said Mr. T. T. Colquhoun, M.Sc., Assistant Plant Pathologist, Waite Agricultural Research Institute, in a talk broadcast through wireless station 5CK.

Spotted wilt has been and still is the worst disease of outdoor grown tomatoes but luckily, it is not a serious trouble in glasshouse grown tomatoes. The glasshouse grower has had other troubles with which to contend such as Verticillum wilt, eelworm, early blight and a variety of insect pests. Latterly another one has come along and it is about this one—Leaf mould—that I wish to speak to-night.

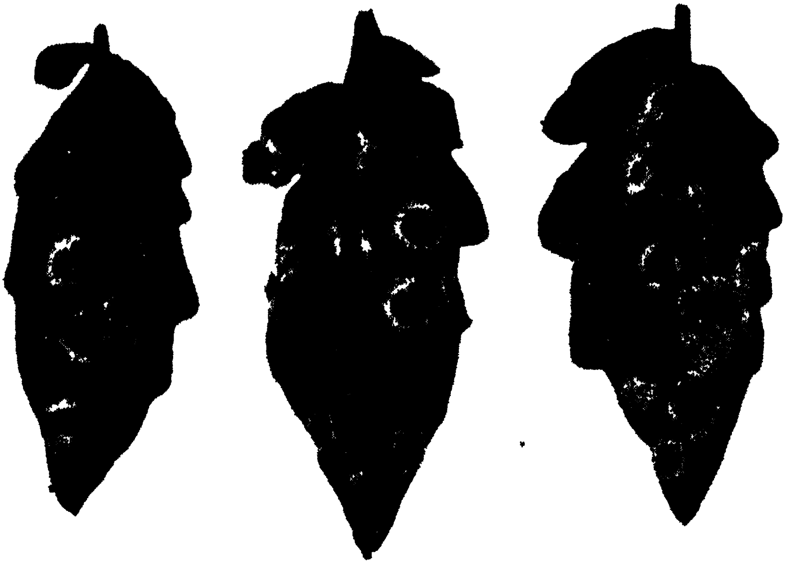
In England and Europe Leaf Mould has been known for many years and it is widespread in America, parts of Africa and nearer home, in New Zealand. Australia remained free from the disease until 1933 when it was reported as being in New South Wales. In 1934 it spread to Victoria and it came to South Australia in the latter part of 1935, when it was confined to isolated areas. In 1936 it became fairly generally established here, but, up to the present time it has not appeared in Western Australia.

To the majority of tomato growers the disease probably needs no description, but lest there be some growers in areas remote from Adelaide who have not yet been visited by the trouble, I shall briefly describe some of the symptoms. The disease principally affects the leaves, particularly the lower older ones. If it occurs on flower trusses, they wither and fail to set fruit. Occasionally the sepals on the fruit may become infected and instances have been seen of the fruit itself being attacked although this is rather uncommon. The disease first appears on the under side of the leaf. A greyish patch develops, later turns olive green and eventually has a purplish velvety appearance. At the same time, faint yellow markings appear on the upper surface, becoming more intense with time. There may be many of these spots on a leaf and if conditions are favourable for the disease, these areas, which are really centres of development or growth of the fungus causing the disease, may extend and mix together until the whole leaf is affected. In such cases, the leaf becomes dry and covered by a dense mass of purplish spores which disperse in clouds if the leaf be shaken. These spores are the means of spreading the disease and we may compare them with the seeds of plants.

The effect of the disease on the plant as a whole depends on the extent to which the leaf is reduced. The leaf may be described as the kitchen of the plant. The roots absorb raw materials and the leaves convert these into food necessary for all growing parts, so just as an army marches on its stomach, a plant grows on its leaves.

Remove this source of food and the plant which includes the fruit, suffers. Thus leaf mould mainly affects the yield indirectly.

Leaf mould is caused by a fungus—*Cladosporium fulvum*—with a simple life history. Let us start with the spores I mentioned previously. These are very small and require a microscope to be seen properly. Over two and a half million would fit on a threepenny bit. A spore alights on a leaf and if conditions are suitable, it germinates, producing a small tube or hypha which grows into the leaf through one of the numerous minute breathing pores on the surface. Once inside, this hypha branches and feeds on the contents of the leaf, killing the invaded parts. The presence of these killed areas is responsible for the discolouration or the spotting of leaves. The mouldy patch on the under surface is formed by hyphae growing out through the breathing pores to give a greyish colour and as the spores form, the purplish velvety appearance becomes pronounced. These spores are then ready to spread the disease.



Tomato Leaves affected by Leaf Mould.

The time the fungus takes to complete this cycle, *i.e.* from spore germination to spore formation, varies with external conditions, particularly temperature and relative humidity. We all know what temperature means, but what, you may ask, is relative humidity? Think of a calm, bright day that we have had lately. It was pleasant till about half past four when a nip came into the air. Did you notice that the grass began to get damp at that time? Or as we say, the dew was settling? This dew is an outcome of humidity. When we put something out in the air to dry, what happens to the water in it? It evaporates and the water vapour is held in the air. At any temperature the air can hold a certain quantity of moisture and the capacity to retain it decreases as the air becomes cooler. Consequently on a bright day, as the temperature drops with nightfall, the air eventually holds its full amount of water vapour and with further cooling, the excess is deposited as dew. When the air is holding the maximum amount of moisture it is said to be saturated or at dew point. If the maximum amount is not present, the actual amount is expressed as a percentage. This figure is the relative humidity and is calculated by taking readings from wet and dry bulb thermometers. Personal comfort is closely related to humidity. We often hear the weather described as a "good dry heat" or that it is "muggy" or "clammy" or "humid." These remarks really refer to the relative humidity, the warmer weather being more oppressive if the relative humidity is high. Thus 100° in Adelaide with its comparatively dry heat is less exhausting than 90° in Sydney with its humid climate.

Now to return to the relationship of leaf mould to relative humidity and temperature.

Dr. Small, working at a research station at Cheshunt, England, found that the most suitable conditions for the disease are a temperature of 72° and a relative humidity of above 80 per cent. in which case the life cycle is completed in ten days. If conditions are humid in the glasshouse, as when a mist forms on the inside glass, quite mild temperatures will allow infection to take place and spores will be produced in abundance but if the air is moving freely and not very moist—more precisely, if the relative humidity is below 70 per cent.—the rate of infection is very low and the formation of spores is restricted.

In co-operation with a number of tomato growers in the Adelaide district, the conditions prevailing in the local glass houses are being investigated. Data on the temperature and relative humidity are being accumulated and it is hoped this will give some indication of the extent to which local conditions may influence leaf mould.

Now how does all this affect the tomato grower in his endeavours to check the disease? It shows the reaction of the fungus to different conditions and the principle of control is to produce conditions unsuitable for the disease whilst giving satisfactory plant growth.

We may consider control from four viewpoints.

Firstly, cultural measures.
Secondly, spraying and dusting.
Thirdly, house hygiene or fumigation.
Fourthly, resistant varieties.

Let us examine the first one. With our climate a temperature suitable for the best development of leaf mould frequently occurs for long periods in glasshouses. There seems to be no practical method of controlling this so we must concentrate on the humidity of the air in the houses. Much can be done with this and herein lies the chief means of control.

Already data collected has shown a marked difference in the humidity of houses side by side which differ only in the stage of development of the plants. In a house with tomatoes from 12in. to 18in. high, wet and dry bulb readings showed that the air was comparatively dry at 3.30 p.m. whilst next door with plants 3ft. or more in height, dew point was reached by that time although the temperatures were the same. This difference is probably due to an increased loss of moisture by the larger plants and a decreased movement of air within the house. It also suggests a reason why younger plants are seldom attacked by leaf mould. Conseqently as the plants increase in size, houses need more ventilation to produce more air movement, particularly at critical periods such as mid afternoon when the houses are still warm. This would seem to be necessary on some occasions even in the colder months of the year for leaf mould has already appeared this season. Later, when the days are warmer it may be necessary to keep the houses open until late in the evening or even all night. Unfortunately many of the South Australian glasshouses are not designed to allow good ventilation and experience may show that improvements in this direction are necessary. As an aid to air movement, plants should not be planted too closely and should be pruned of all excess foliage, particularly the lower leaves.

Figures obtained last year showed no increase of humidity following watering, but it would be advisable to water early in the day. Excessive watering should be avoided as it produces soft susceptible plants.

Spraying.—There is considerable difference of opinion amongst overseas investigators regarding the effectiveness of spraying or dusting. In the experiments carried out, no spray or dust has effectively controlled leaf mould when it has been a serious attack.

Of course, it must be remembered that a spray can only prevent infection, it cannot cure the disease when it is already in the leaf, and since the incubation period can vary from 10 to 30 days, it is necessary to apply the cover in good time—not when the mould appears. Also cover on both sides of the leaf is necessary and it seems difficult to get sufficient spray adhering to the lower surface.

Information regarding the effect of sprays in South Australia is rather meagre and I should be glad to hear of the experiences of growers. From Germany two reports have been published. One states that the spores of leaf mould are resistant to fungicides up to a strength which cause injury to the plant. The other gives the results of treatment with a machine known as a "Sulphurator," the essentials of which are the blowing of a stream of air through molten sulphur so that the house becomes filled with sulphur mist which gradually settles on the plants. Almost complete protection has been claimed for this treatment, but I am not aware of such a machine in Australia.

Leaf mould spores are resistant to summer weather conditions and if lodged in the framework of houses may infect the following year's crop. Fumigation is necessary, the house being empty and sealed at the time. Burning flowers of sulphur at the rate of 1lb. to 1,000cub. ft. is effective. Thus for the ordinary house 15ft. wide and 6ft. 6in. high, half a pound of sulphur every 5ft. along the length is sufficient. It should be spread out on paper to give quick burning and rapid gas development. This treatment is fatal to plants and can only be used in empty houses.

The ideal method of control is the production of resistant varieties. Work along these lines has been carried on in England and America for over 10 years and resistant varieties have been found. These are used as a basis for cross breeding with good commercial strains and the results to date show distinct promise.

So far as outdoor grown tomatoes are concerned, I have only seen one instance where leaf mould had developed and in that case it was mild, the plants apparently having grown away from it—the conditions probably became too dry for the fungus to develop.

Summarising the possible measures for control, I suggest:—

1. Ventilate as much as possible.
2. Create free air movement by judicious planting and pruning.
3. Give heavy but not excessive waterings.
4. When empty fumigate the houses by burning sulphur.

Production and Exports.

The production of butter and cheese for May, 1937, was:—Butter, 775,729lbs. cheese, 505,737lbs.; for June, 1937, was:—Butter, 927,285lbs.; cheese, 550,632lbs.

The following figures are extracted from the Australian Meat Board statistics.—

Total Australian meat exports to all countries for the year ended 30th June, 1937:—

	Cwts.
Chilled beef	378,624 (S. Aus., nil)
Frozen beef and veal	1,882,785 (S. Aus., 9,233)
Total all beef and veal	2,261,409cwts.
Mutton and lamb—	Carcasses.
Mutton	927,316 (S. Aus., 564)
Lamb	5,141,370 (S. Aus., 400,622)
Total.	6,068,686 carcasses
	Carcasses.
Pig meat	229,371 (S. Aus., 14,408)

Review of the Competition for the Month of July. Completion of Winter Test

[By C. F. Anderson (Chief Poultry Adviser and A. Clifton (Competition Attendant).]

Increased Production.—Although several wet days and particularly cold nights were experienced during July, the production of the Competition birds increased considerably, being more than 7 per cent. over the production for the month of June. The percentage lay for July was 54.5 per cent. This is the first month in the Competition where the figures for the 1937-38 Competition have been better than the 1936-37 Competition. In July of last year the percentage was 53.2 per cent. Production for the first three months was considerably below that of the corresponding period last year, and the birds certainly made a very definite recovery for the month of July. With the increased production, so the quantity of food has been increased, particularly the wet mash in the morning, indicating the need at this particular time of the year for the close study of the requirements of the stock, where reasonable production is expected.

Highest score, Winter Test, 1st April, 1937, to 31st July, 1937. Rhode Island Red pullet, owned by Master K. Johnson, Two Wells. Score, 93 first grade eggs.

Second highest score, Winter Test, 1st April, 1937, to 31st July, 1937. Light Sussex pullet owned by Mr. H. H. Gallagher, Pooraka. Score, 92 first grade eggs.

Third highest score, Winter Test, 1st April, 1937, to 31st July, 1937. Black Orpington pullet owned by Mr. C. A. Maxwell, Aldgate. Score, 89 first grade eggs.

Death Rate.—There were two deaths during the month, bringing the total number of deaths up to four, and it is interesting to note that this is equal to less than 1 per cent. in the first four months of the Competition.

The end of July was the completion of the Winter Test, and some very interesting scores were recorded for that period—1st April to 31st July:—In the Wet Mash Section for White Leghorns, the leading bird was entered by Mr. S. Hill, having laid 88 first grade eggs—three less than last year. Mr. C. A. Maxwell's Black

Orpington recorded 89 first grade eggs in that section, which was seven more than the previous year.

It is very interesting to note that the highest score in the Winter Test was recorded by the Rhode Island Red entered in the Home Project Section by Master Keith Johnson, of Two Wells, with a score of 93 first grade eggs. This bird was followed closely by a Light Sussex owned by Mr. H. H. Gallagher, laying 92 eggs.

A new section in the Competition was provided this year for Light Sussex. As mentioned previously, the leading bird for the Winter Test laid 92 first grade eggs. It is also interesting to record that the three highest scores in the Winter Test were by heavy breeds; a Rhode Island Red with 93, Light Sussex with 92 and a Black Orpington with 89.

The other new section—the Soaked Grain—recorded some good performances. The highest score here is a White Leghorn owned by Mr. N. Johns, with a score of 82 first grade eggs. Notable laying in this section was that of a Black Orpington pullet owned by Mr. V. F. Gameau. The bird laid 29 first grade eggs in the month of July and is now in second position in that section.

Feeding Tests at Parafield Poultry Station.

A new series of feeding tests was commenced at Parafield Poultry Station on the 1st April, 1937. Five tests have been arranged each of 50 White Leghorn pullets. The principal object of these tests is to collect some accurate data concerning the results obtained from the soaked grain method of feeding in different ways, also the production of the birds under the various methods of feeding. The following is a list of the tests that have been arranged:—

A. Morning—Soaked wheat at rate of 8lbs. grain per 100 birds, meat meal ½lb. per 100 birds, greenfeed same quantity as dry grain. Afternoon—Same as morning, but meat meal ¼lb. per 100 birds.

B. Morning—Soaked wheat at rate of 8lbs. per 100 birds, ¼lb. meat meal per 100 birds, ¼lb. linseed meal per 100 birds, greenfeed same as No. 1 test. Afternoon—Same as morning, but without the ¼lb. linseed meal.

C. Morning—Soaked wheat once a day at rate of 8lbs. per 100 birds, meat meal ¾lb. per 100 birds. Afternoon—Dry wheat at rate of 1¼ozs. per bird.

D. Morning—Soaked barley twice a day at rate of 8lbs. per 100 birds, greenfeed same quantity as dry grain, meat meal ¼lb. per 100 birds. Afternoon—Greenfeed same quantity as dry grain, meat meal ¼lb. per 100 birds.

E. Morning—Soaked wheat and barley at rate of 4lbs. wheat and 4lbs. barley per 100 birds, greenfeed same bulk as dry grain, meat meal ½lb. per 100 birds, linseed meal ¼lb. per 100 birds. Afternoon—Dry grain at rate of ¾oz. wheat per bird and ¾oz. barley per bird.

The quantity of food as stated in the test will vary from time to time according to the requirements of the birds. The quantities stated in the tests are given as a basis, but are also liable to alteration according to the requirements af the stock.

Test.	No. Eggs Laid from 1st April, 1937, to 1st June, 1937.	No. Eggs Laid, July, 1937.	Total Eggs Laid from 1st April, 1937, to 31st July, 1937.
A	1,411	668	2,079
B	1,205	654	1,859
C	1,272	538	1,810
D	880	389	1,269
E	965	680	1,645

	Value of Eggs.		Cost of Food.		Return Above Cost of Food for July, 1937.	Total Return Above Cost of Food, 1st April to 31st July, 1937.
	1st April to 30th June, 1937.	July, 1937.	1st April to 30th June, 1937.	July, 1937.		
	£ *s.* *d.*	£ *s.* *d.*	£ *s.* *d.*	£ *s.* *d.*	£ *s.* *d.*	£ *s.* *d.*
A	8 15 10	3 4 11	3 6 10	1 3 5	2 1 6	7 10 6
B	7 9 2	3 3 7	3 5 5	1 3 4	2 0 3	6 4 0
C	7 18 5	2 12 4	3 7 7	1 3 5	1 8 11	5 19 9
D	5 10 3	1 17 10	3 7 9	1 3 3	0 14 7	2 17 1
E	5 19 4	3 6 1	3 7 5	1 3 2	2 3 4	4 15 3

Agricultural Bureau of South Australia

Pinnaroo Line Bureaux

Pinnaroo Line Branches of the Agricultural Bureau held their annual Conference at Lameroo on 3rd August, delegates being present from Parilla Well, Parrakie, Parilla, Pinnaroo and Lameroo. Mr. M. Morcom presided, and the opening address was delivered by Mr. P. J. Baily, member of the Advisory Board of Agriculture. Mr. A. J. A. Koch also attended.

Although only one paper—"The Grassing of Pastures with Wimmera Rye-grass in conjunction with Wheat Growing"—by Mr. J. J. Ferguson, a young member of the Parilla Well Branch, was read, the discussions following questions submitted to officers of the Department were most instructive.

Mr. Baily presented trophies to the successful competitors in the Chandos Crop Competition:—First, J. T. W. Werner, Lameroo; second, C. W. Lehmann, Lameroo; third, W. S. Cabot and P. Ross, Parrakie.

Conference decided to hold the 1938 gathering at Parilla.

The following resolutions were carried:—"That with a view to assisting the work of organising District Conference and generally stimulating interest in the Agricultural Bureaux in this Conference District, a committee consisting of a representative of each Branch of the Agricultural Bureau in this district be formed to undertake such work." "That primary producers be granted a concession in motor car registration similar to that in Victoria."

At the evening session, Mr. R. C. Scott (Chief Agricultural Adviser) gave an address, illustrated with lantern slides, on "A Visit to New Zealand."

Upper North Bureaux Conference

Presided over by Mr. E. W. Sismey and opened by the Hon. A. P. Blesing, M.L.C. (Minister of Agriculture), the Annual Conference of Upper North Branches of the Agricultural Bureau, held under the auspices of the local Bureau at Booleroo Centre on 21st July, fully maintained the very high standard that Branches in this locality have set for their district gatherings. Rarely has a Conference commenced with a bigger attendance, the large institute being filled to capacity.

Worthy of special mention, also, is the fact that in the districts represented by the Conference there are 15 very active Women's Branches, which were represented by about 200 delegates. A report of the proceedings of the Conference would not be complete without making a reference to the number of young men who attended, and the active part they took in the subjects introduced for discussion. The local Bureau staged an attractive exhibit of fresh vegetables, flowers, cured meats, preserved fruits and a splendid display of women's handicrafts.

The Minister was supported by the following officers:—Hon. A. L. McEwin, M.L.C. (Chairman of the Advisory Board of Agriculture), Messrs. W. J. Spafford (Director of Agricultre), R. C. Scott (Chief Agricultural Adviser), R. H. F. Macindoe, B.V.Sc., M.R.C.V.S. (Deputy Chief Inspector of Stock), C. A. Goddard (Assistant Wool Instructor of the School of Mines), District Officers of the Department of Agriculture, H. C. Pritchard (General Secretary), and F. C. Richards (Assistant Secretary of the Agricultural Bureau).

The following papers aroused spirited discussions:—"Noxious Weeds," Mr. C. Giddings (Yandiah); "The Plough, Fallowing and Treatment of Fallows," Mr. T. H. Borgas (Booleroo Centre); "Breakwinds and Hedges for Farms," Mr. P. J. Curnow (Wirrabara); "Butterfat Prices," Mr. S. G. McCallum (Morchard).

Mr. Goddard spoke on the "Marketing of Wool," and Departmental Officers replied to questions and took part in the discussions.

The following resolutions were adopted:—"That we as a body of farmers through the Agricultural Bureau request Fertiliser Sales Ltd. to send on to farmers the particular brand they order, whether it be Wallaroo-Mount Lyell, Cresco, or Top." The General Secretary undertook to bring under the notice of the phosphate companies and the Railways Commissioner the question of the supply and despatch of superphosphate to country centres. "That conditions of Class 3001 at the Royal Agricultural and Horticultural Society Show for the best bag of wheat entered in Crop Competitions be altered to read 'All winning competitors (first) be eligible to enter Class 3001 regardless of yield of crop'." "That Wheat Crop Competitions at the Royal Agricultural and Horticultural Society Show be more prominently placarded so that individual classes can be distinguished at a glance." "That we strive or support any move for a reduction in the duty on petrol." "That points for apparent yield be deleted from the judging schedule in the Far Northern Wheat Crop Competition and the points be distributed in the balance of the judging schedule." It was decided that the 1938 Conference should be held at Appila.

At the evening session Mr. Scott delivered an address, illustrated with lantern slides, on "A Visit to New Zealand."

Murray Lands West

Coomandook Branch this year organised the Murray Lands West Branches' Conference, which was held at Karoonda on 5th August. Mr. F. E. Ballard presided, and Mr. A. J. A. Koch, of the Advisory Board of Agriculture, delivered the opening address. Mr. J. B. Murdoch was present also. Delegates were present from Branches as far afield as Coonalpyn (60 miles), Coomandook, Borrika, Kulkawirra, Wynarka, Nunkeri, Yurgo.

In addition to subjects set down for discussion, which included stock ailments, wheat varieties, crop competitions, fodder plants, &c., the following papers were read:—"Sheep Dipping," Mr. W. R. Trestrail (Coomandook); "Can Lands of the Mallee be made to Carry 1 Sheep to 1½ acres"? Mr. E. L. Cowled (Borrika); "Bringing Second-class Land of the Coomandook District into Production," Mr. M. F. Ballard (Coomandook); "The Rabbit Question," Mr. R. Elliot (Kulkawirra); "The Farm Labourer," Mr. A. L. Burton (Yurgo); and "Care of Machinery," Mr. G. Sutherland Coonalpyn.)

It was decided that the next year's Conference should be held at Karoonda with the Kulkawirra Branch to make arrangements.

It was resolved "That the Government should make available to the Council for Scientific and Industrial Research an island on which to conduct experiments for the extermination of rabbits."

At the evening session Mr. Scott spoke on "A Visit to New Zealand."

Molasses in Livestock..

Asking of what value molasses is for livestock, a member of the Mangalo Branch of the Agricultural Bureau has been advised by Mr. C. T. McKenna, B.V.Sc., of the Stock and Brands Department, that molasses is mainly used to make inferior hay or straw, &c., palatable. In this way stock are induced to eat more of the inferior feed and to waste less than otherwise. It has a favourable effect on the health of animals and serves as a tonic for those which are out of condition. Amounts, cattle and horses, 2lbs.-3lbs. daily. It is thinned down with water before mixing with the feed. The food value of molasses is due to its sugar content (62-65 per cent.) and it is therefore of value as a carbohydrate food. As a source of protein, it is of little nutritive value.

Advisory Board

The monthly meeting of the Advisory Board was held on Wednesday, 30th June, there being present:—Messrs. H. Wicks (Acting Chairman), F. Coleman, A. J. A. Koch, S. Shepherd, J. B. Murdoch, P. J. Baily, C. A. Loxton (Chief Inspector of Stock), W. J. Spafford (Director of Agriculture), Prof. A. J. Perkins, Dr. A. E. V. Richardson (Director Waite Agricultural Research Institute), and H. C. Pritchard (Secretary). Apologies were received from Hon. A. L. McEwin M.L.C., and Messrs. R. H. Martin, and A. M. Dawkins.

Board Membership.—The Chairman welcomed Mr. C. A. Loxton (Chief Inspector of Stock) as a member of the Advisory Board.

New Members:—Approval was given for the addition of the following names to the rolls of existing Branches:—Beetaloo Valley—E. Stephens; Blackwood—N. Magarey; Blewitt Springs—W. Goodhand, C. White; Bute—H. G. Perry, E. W. Heinrich, R. J. Hall, M. McPherson; Carey's Gully—Lawrence Badenoch, Colin White, Robert Neighbour; Glencoe—J. Dow; Green Patch—Brian Hyde; Keyneton—Col. E. T. Dean, E. G. Dean, Rev. L. Robjohns, W. L. Moore, C. E. L. Schulz, H. O. Schulz, A. O. Cook, E. G. Tscharke, H. W. Tscharke, W. G. Lillecrapp, A. J. Graetz, G. L. Graetz, H. A. Graetz; Kingston—H. F. Banks, L. G. Starling, Rev. Thompson, W. J. Doyle; Laura Bay—M. Ward, F. Fisher; Maltee—Stanley Morgan; Mangalo Women's—Mrs. Petherick; McLaren Flat Women's—Mrs. A. Foggo; Milang—H. Ness, G. Bentley; Morchard—L. McN. Brice; Myponga Women's—Mrs. G. Maslin, Miss M. Maslin, Mrs. H. Shepherd, Miss B. Shepherd; Nunjikompita—Francis May, Charles J. May, Bert Ross, Fred Ross; Pinnaroo Women's—Miss Molly Fisher; Rendelsham Women's—Mrs. M. Huppatz; Summerfield—G. Adolf Kubenk, Hermann A. Wagenknecht, Harold Marshall, Arnold H. Paech; Wepowie Women's—Mrs. D. Kaehne; Whitwarta—J. Williams.

Life Members.—Life Membership of the Agricultural Bureau was conferred upon Arthur H. Tilbrook (Morchard), T. B. Brooks (Clarendon), M. P. Daly (Eurelia), S. A. Pengilly (Red Hill), F. W. Sharp (Carey's Gully), F. T. Freeth (Pinkawillinie), J. J. Cronin (Coonalpyn).

Change of Branch Name.—Approval was given for the name of the Glencoe East Branch to be altered to Glencoe.

Branches Closed.—The Board decided to close the Mt. Schanck, Richman's Creek, Belalie North and Goode (Women's) Branches.

Annual Congress.—The Secretary reported that the Government had approved of the Annual Conference being held this year under the same conditions as had applied in the past.

The Chairman, Vice-Chairman, Messrs. A. J. Cooke, H. N. Wicks, W. J. Spafford and the Secretary were appointed as a Committee to supervise arrangements.

Crop Competitions.—The Board was informed that the Government had approved of the Board's recommendation that the subsidy of shilling for shilling up to 10s. per entry apply to competitions instead of 10s. per entry, as asked by the Chandos Committee.

Several items were taken in Committee.

The monthly meeting of the Advisory Board was held on Wednesday, 28th July, there being present Hon. A. L. McEwin, M.L.C., Messrs. F. Coleman, R. H. Martin, H. N. Wicks, A. J. Cooke, J. B. Murdoch, S. Shepherd, A. J. A. Koch, A. M. Dawkins, C. A. Loxton, W. J. Spafford, Dr. A. E. V. Richardson, and H. C. Pritchard (Secretary.)

Apologies were received from Mr. P. J. Baily and Prof. A. J. Perkins.

Election of Officers.—Sir Wallace Sandford was elected Chairman and Mr. S. Shepherd Vice-Chairman.

New Members.—The following names were added to the rolls of existing Branches:—Balumbah Women's — Mrs. Ollie Holland; Baroota—W. J. McDougall, W. A. McDougall, H. Cliff; Berri—O. E. Halliday, H. Kenniwell, A. G. Laddern, W. Powell, J. P. Jarrett, W. A. Fiedler, C. O. Scott, J. E. Hamlyn, A. Draper, H. Tucker; Blackheath—R. Gilbert; Echunga—B. Lee; Gladstone—E. G. Phillips; Glencoe—L. F. Koop, R. H. Agnew, S. J. Bonney, C. Hunter, P. C. Blackmore; Hope Forest and District Women's—Mrs. E. Hill, Mrs. N. G. Bates, Mrs. A. A. Bell, Mrs. M. Moyle; Karte—R. B. Blaschik, F.

T. Blaschik; Karte Women's—Mrs. E. Flavel, Mrs. D. Ahrns; Miss L. Guthleben; Keyneton—H. A. Bittner, E. B. Kruger, P. H. Schultz, J. A. E. Henschke, A. Schutz, J. McKay, W. Daly; Lameroo—Weldon; Loxton—A. W. Traeger, B. C. Watson, E. H. Potts, C. H. Glatz, R. Edwin Thiele; MacGillivray—K. J. Wiadrowski; Maltee Women's—Mrs. Martin; McLaren Flat—D. Hunt, Ross Elliott; McLaren Flat Women's—Mrs. Wilton Hobbs, Mrs. E. F. M. Bau; Mount Pleasant—R. Cooper, H. G. Verrall; Owen Women's—Mrs. K. Harkness; Mrs. G. A. Rapk, Miss E. Wood, Miss J. Wood, Mrs. J. Painter (jun.); Parilla Well Women's—Mrs. E. V. Byerlee; Parrakie—Allan Temby; Paskeville—Jas. Francis Barton; Penola—J. H. Skinner, I. C. Cameron, E. Satchell, C. H. Stephens, D. Abbey, L. Adamson, J. Adamson; Pygery—Ernest Max Schlegel; South Kilkerran—A. Lutz; Upper Wakefield—C. F. Neumann, E. C. Gregor; Warcowie—Miss Essie May Chapman, Miss Una Elsie Growden; Mrs. J. T. Marron, Mrs. Maude Shute; Wepowie—Walter Colin Addison, Gerald B. Addison, Les. Cain, Wm. Cameron Dowling, Norman Lewis Roocke, Keith Geo. Gregurke; Willowie Women's—Miss May Stone; Wudinna—W. McCracken, C. Ayliffe, J. Butterfield, C. Camplin, P. Mahood; Yundi—Alec. Jamieson.

Life Members.—Approval was given to the appointment of the following persons as Life Members of the Agricultural Bureau:—Mr. S. Davis (Parilla Well), F. H. Klauber (Lyndoch), V. W. Gardner (Koppio), J. R. Potter (Gladstone), C. A. Coe (Gladstone).

Other items were taken in committee.

Agricultural Shows

We have been advised by Secretaries of Agricultural Show Societies that their shows will be held on the following dates:—

Crystal Brook, Wednesday, 1st September.
Gawler, Thursday, 23rd September.
Denial Bay, Friday, 24th September.
Tailem Bend, Saturday, 25th September.
Balaklava and Dalkey, Saturday, 25th September.
Tailem Bend, Saturday, 25th September.
Waikerie, Saturday, 25th September.
Eudunda, Wednesday, 29th September.
Wudinna, Wednesday, 29th September.
Wirrulla, Friday, 1st October.
Kadina, Saturday, 2nd October.
Two Wells, Saturday, 2nd October.
Kapunda, Saturday, 2nd October.
Orroroo, Wednesday, 6th October.
Streaky Bay, Wednesday, 6th October.
Renmark, Wednesday, 6th October.
Karoonda, Wednesday, 6th October.
Murray Bridge, Thursday, 7th October.
Wanbi, Saturday, 9th October.
Moonta, Saturday, 9th October.
Cleve, Saturday, 9th October.
Blyth, Saturday, 9th October.
Jamestown, Wednesday, 13th October.
Strathalbyn, Wednesday, 13th October.
Tarlee, Wednesday, 13th October.
Penola, Wednesday, 13th October.
Colton, Wednesday, 13th October.
Loxton, Wednesday, 13th October.
Kimba, Wednesday, 13th October.
Brown's Well (Paruna), Saturday, 16th October.
Kingston, Saturday, 16th October.
Mannum, Saturday, 16th October.
Pinnaroo, Wednesday, 20th October.
Maitland, Wednesday, 20th October.
Mount Gambier, Wednesday and Thursday, 20th and 21st October.
Willunga, Thursday, 21st October.
Clare, Saturday, 23rd October.
Port Elliot, Saturday, 23rd October.
Minlaton, Wednesday, 27th October.
Tatiara (Bordertown), Wednesday and Thursday, 27th and 28th October.
Millicent, Saturday, 30th October.
Burra, Saturday, 30th October.
Yankalilla, Saturday, 30th October.
Mount Barker, Saturday, 6th November.
Woodside, Saturday, 13th November.
Kalangadoo, Saturday, 13th November.
Mundalla, Wednesday, 9th March, 1938.
Mount Pleasant, Thursday, 17th March, 1938.

Entero-toxaemia—Vaccination of Sheep.

Veterinary officers of the Stock and Brands Department have supplied the following information in response to a request from the Secretary of the Wudinna Branch of the Agricultural Bureau:—

1. The use of the vaccine as a preventive for entero-toxaemia is definitely a payable proposition in cases where losses from the disease are over 1 per cent. to 2 per cent.

For example:—The cost of vaccine for 500 lambs is 21s. 6d., and if only 1 lamb is saved the vaccine is paid for. If the flock is not inoculated and 5 lambs die, *i.e.*, 1 per cent., the vaccine could have been paid for approximately 5 times.

2. Results have been published of 1 flock in particular in which 1,800 lambs were inoculated with the vaccine, and of these 2 per cent. died, while of 500 uninoculated lambs 11 per cent. died. Besides these published figures the experience of sheep owners indicates that the use of the vaccine is followed by a considerable decrease in the number of deaths. It must be remembered that no vaccine is 100 per cent. perfect, and that an odd death may still occur after inoculation.

3. The serum can be obtained from the Commonwealth Serum Laboratories, Parkville, N.2, Victoria, or through the Chief Quarantine Officer (General), Peel Chambers, Peel Street, Adelaide. The cost is as follows:—

	Sheep.		Lambs.	
	1st Injection.	2nd Injection.	1st Injection.	2nd Injection.
*50 c.c., 1s. 6d., sufficient for .	17	7	25	10
100 c.c., 2s., sufficient for ..	34	14	50	20
250 c.c., 4s., sufficient for	84	36	125	50
500 c.c., 7s., sufficient for	167	71	250	100
1,000 c.c., 12s. 6d., sufficient for	234	143	500	200
2,500 c.c., 21s. 6d., sufficient for	833	357	1,250	500
5,000 c.c., 41s. 8d., sufficient for	1,667	714	2,500	1,000

A 20 c.c. syringe and two needles may be obtained through Fauldings, Bickfords, Farmers' Union, and most chemists for approximately 18s. 6d. to £1. The first dose of vaccine should be injected into the ewes about 2 months before lambing, and the second dose 1 month before.

If this is done the lambs obtain the immunity through their mother's milk, and this keeps them safe up to 4-6 weeks of age, when they should be inoculated and given their second dose a month later.

If the disease makes its appearance in the flock they may be done immediately, and then two weeks later. Adult sheep receive 3 c.c. the first time, and 7 c.c. the second time. Lambs receive 2 c.c. first injection, and 5 c.c. the second time.

The syringe is marked off in cubic centimetres; when ordering the vaccine it is necessary to estimate the total amounts required for the first injection and for the second injection so that it may be forwarded in suitably-sized containers. This is so that any container once opened may be used up and not held over half emptied till the second injection is given a month later.

The injection is given in the clean skin under the armpit. The area where the needle is to be pushed through the skin should be swathed with a piece of cotton wool soaked in methylated spirits.

6. There is no reason why any farmer of ordinary intelligence should not do the job himself. He must remember, however, to take his syringe to pieces, put in cold water which is then boiled for 5 minutes both before and after doing the flock and at the end of each day's work.

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* Since the above information was supplied to the Wudinna Branch the following alterations in price of vaccine have been received:—

Prices and sizes of containers as from 4th August, 1937:—50 c.c., 1s. 6d.; 100 c.c., 2s.; 250 c.c., 3s. 6d.; 500 c.c., 6s.; 1,000 c.c., 10s.; 6 x 1,000 c.c., £2 10s. The containers are now all glass. The 5,000 c.c. container is not now on sale; its substitute is a parcel containing six 1,000 c.c. containers. If 1,000 c.c. containers are ordered in addition to the 6 x 1,000 c.c. parcel, they will be priced at the same rate, i.e., 8s. 4d. per 1,000 c.c. container.

Rainfall Table

The following figures, from data supplied by the Commonwealth Meteorological Department, show the rainfall of the subjoined stations for the month and to the end of July, 1937; also the average precipitation for July, and the average annual rainfall.

Station.	For July, 1937.	Av'ge. for July.	To end July, 1937.	Av'ge. Annual Rain-fall.
Far North and Upper North.				
Oodnadatta	—	0·22	0·43	4·60
Marree	—	0·33	2·68	5·80
Farina	—	0·35	3·62	6·37
Copley	—	0·45	4·05	7·76
Beltana	—	0·54	4·96	8·39
Blinman	0·81	1·06	7·61	11·71
Hookina	0·32	1·13	6·71	10·94
Hawker	0·60	1·25	9·31	12·09
Wilson	0·55	1·19	8·19	11·65
Gordon	0·46	0·92	7·57	10·33
Quorn	0·98	1·42	10·03	13·10
Port Augusta	0·52	0·71	6·35	9·40
Bruce	0·51	0·93	8·66	9·74
Hammond	0·50	1·02	7·70	11·05
Wilmington	1·55	2·00	11·88	17·18
Willowie	0·58	1·25	7·65	12·10
Melrose	2 06	2·83	12·89	22·80
Booleroo Centre	1·07	1·61	9·35	15·14
Port Germein	1·19	1·13	8·13	12·51
Wirrabara	2·34	2·34	14·13	19·22
Appila	1·15	1·52	9·63	14·59
Cradock	0·62	0·97	8·07	10·67
Carrieton	0·49	1·25	7·23	12·11
Johnburg	0·43	0·94	8·83	10·49
Eurelia	0·69	1·24	7·97	12·66
Orroroo	0·78	1·32	8·82	13·12
Nackara	0·93	0·98	9·40	11·09
Black Rock	0·71	1·18	6·97	12·26
Oodlawirra	0·53	1·06	8·31	11·34
Peterborough	0·69	1·24	6·41	13·14
Yongala	0·98	1·46	8·68	14·37
North-East.				
Yunta	0·23	0·58	9·39	8·44
Waukaringa	0·22	0·58	7·67	7·82
Mannahill	0·10	0·57	8·23	8·08
Cockburn	—	0·51	7·13	7·81
Broken Hill	0·70	0·71	5·88	9·40
Lower North.				
Port Pirie	0·96	1·23	8·41	13·18
Port Broughton	0·80	1·50	9·48	13·87
Bute	0·68	1·89	8·98	15·42
Laura	1·50	2·01	9·51	17·93
Caltowie	1·23	1·74	9·07	16·69
Jamestown	1·61	2·00	10·56	17·68
Gladstone	1·51	1·77	8·79	16 31
Crystal Brook	1·26	1·64	9·96	15·79
Georgetown	1·57	2·02	8·93	18·24
Narridy	1·38	1·67	10·20	15·74
Red Hill	0·78	1·87	10·28	16·55
Spalding	1·25	2·02	8·98	18·68
Gulnare	1·36	2·13	9·94	18·51
Yacka	0·93	1·70	8·48	15·38
Koolunga	0·80	1·71	7·66	15·29
Snowtown	0·91	1·74	9·76	15·69
Lower North—*continued.*				
Brinkworth	0·92	1·70	9·52	15·72
Blyth	1·00	1·83	10·25	16·73
Clare	1·85	3·07	15·01	24·43
Mintaro	1·26	2·84	12·81	23·30
Watervale	1·97	3·14	15·83	26·69
Auburn	1·66	2·96	12·11	23·92
Hoyleton	1·58	1·93	10·30	17·25
Balaklava	1·18	1·66	11·35	15·41
Port Wakefield	1·28	1·33	9·44	12·93
Terowie	0·70	1·31	8·33	13·27
Whyte-Yarcowie	0·79	1·38	9·27	13·54
Hallett	1·24	1·83	10·31	16·39
Mount Bryan	1·52	1·97	10·46	16·76
Kooringa	0·97	2·14	9·99	17·78
Farrell's Flat	1·21	2·15	11·47	18·52
West of Murray Range.				
Manoora	1·19	2·12	9·74	18·91
Saddleworth	1·08	2·25	12·34	19·56
Marrabel	1·30	2·31	12·20	19·91
Riverton	1·37	2·39	12·60	20·79
Tarlee	1·14	1·95	9·50	18·06
Stockport	1·23	1·82	9·70	17·02
Hamley Bridge	1·13	1·77	9·09	16·52
Kapunda	1·07	2·30	8·96	19·74
Freeling	1·09	1·97	7·39	17·79
Greenock	1·04	2·49	8·94	21·47
Truro	0·79	2·32	8·78	19·75
Stockwell	1·02	2·33	8·49	20·02
Nuriootpa	1·20	2·48	10·31	20·74
Angaston	1·78	2·70	11·47	22·33
Tanunda	1·65	2·63	10·11	21·97
Lyndoch	2·05	2·95	10·59	23·28
Williamstown	1·61	3·63	12·70	27·54
Adelaide Plains.				
Owen	1·43	1·62	11·31	14·78
Mallala	0·74	1·80	7·36	16·43
Roseworthy	1·07	1·94	6·99	17·43
Gawler	1·40	2·19	9·11	18·85
Two Wells	1·35	1·81	7·69	15·80
Virginia	1·62	1·92	9·72	17·22
Smithfield	1·49	1·97	11·12	17·68
Salisbury	1·25	2·08	10·46	18·55
Adelaide	1·90	2·64	12·54	21·17
Glen Osmond	1·69	3·35	14·21	25·97
Magill	1·84	3·11	14·52	25·36
Mount Lofty Ranges.				
Teatree Gully	2·07	3·16	14·33	27·03
Stirling West	3·80	6·25	25·57	47·01
Uraidla	3·41	5·91	22·93	43·83
Clarendon	3·00	4·23	17·28	32·81
Happy Valley Res.	2·13	—	14·04	—
Morphett Vale	2·26	2·88	14·54	22·62
Noarlunga	3·00	2·67	13·14	20·35
Willunga	2·70	3·60	12·87	25·96
Aldinga	1·79	2·69	12·41	20·21

RAINFALL—*continued.*

Station.	For July, 1937.	Av'ge. for July.	To end July, 1937.	Av'ge. Annual Rainfall.
MOUNT LOFTY RANGES—*continued.*				
Myponga	2·62	4·37	16·12	29·72
Inman Valley	2·81	—	15·34	—
Yankalilla	2·11	3·11	13·16	22·78
Mount Compass	3·13	4·77	16·11	36·25
Mount Pleasant	1·33	3·57	11·14	27·08
Birdwood	2·06	3·86	13·13	29·02
Gumeracha	2·15	4·26	16·35	33·28
Millbrook Reservoir	2·64	4·46	18·55	34·50
Lobethal	2·52	4·95	18·77	35·94
Woodside	2·28	4·29	14·89	32·16
Hahndorf	2·42	4·66	15·55	34·82
Nairne	2·01	3·68	12·27	28·14
Mount Barker	2·24	4·22	13·63	31·24
Echunga	2·88	4·21	16·08	33·30
Macclesfield	2·24	4·02	12·42	30·37
Meadows	3·32	4·73	17·60	36·02
Strathalbyn	1·39	2·49	9·75	19·34
MURRAY FLATS AND VALLEY.				
Meningie	1·29	2·35	9·02	18·29
Milang	0·99	1·80	6·97	14·85
Langhorne's Creek	0·81	1·73	7·37	14·93
Wellington	0·70	1·50	7·52	14·66
Tailem Bend	0·70	1·53	7·58	15·07
Murray Bridge	0·72	1·38	5·25	13·49
Callington	0·66	1·73	5·88	15·14
Mannum	0·39	1·15	6·37	11·49
Palmer	0·82	1·79	8·38	15·63
Sedan	0·41	1·19	7·15	12·01
Swan Reach	0·59	0·93	5·87	10·62
Blanchetown	0·55	0·90	5·36	10·95
Eudunda	0·61	1·89	8·97	17·13
Point Pass	0·80	1·98	10·50	16·66
Sutherlands	0·48	1·03	9·45	10·71
Morgan	0·28	0·71	6·56	9·10
Waikerie	0·27	0·73	6·03	9·59
Overland Corner	0·34	0·78	5·23	10·18
Loxton	0·75	0·97	4·89	11·34
Berri	0·75	0·89	6·10	10·03
Renmark	0·77	0·83	6·94	10·33
WEST OF SPENCER'S GULF.				
Eucla	0·56	0·91	5·10	10·08
Nullarbor	0·53	0·97	3·47	8·87
Fowler's Bay	1·11	1·72	5·42	11·93
Penong	1·18	1·69	6·35	12·28
Koonibba	1·53	1·60	6·82	12·18
Denial Bay	1·71	1·52	6·20	11·33
Ceduna	0·88	1·31	4·58	10·32
Smoky Bay	1·15	1·52	5·68	10·50
Wirrulla	1·06	1·34	8·83	10·87
Streaky Bay	2·48	2·35	7·77	14·91
Chandada	2·03	1·94	7·12	12.66
Minnippa	1·55	1·90	7·34	13·97
Kyancutta	1·07	1·96	5·95	13·45
Talia	1·97	2·29	9·02	14·76
Port Elliston	1·98	2·63	9·17	16·53
Lock	1·45	2·25	7·99	16·44
Mount Hope	2·42	—	13·87	—
Yeelanna	2·11	2·57	9·65	16·11
Cummins	2·93	2·89	11·15	17·70
Port Lincoln	2·99	2·98	9·77	19·35
Tumby	1·01	1·99	6·24	14·29
Ungarra	1·75	2·46	9·11	16·94
Port Neil	0·93	1·55	4·93	13·16
WEST OF SPENCER'S GULF—*continued.*				
Arno Bay	0·77	1·49	6·24	12·82
Rudall	1·25	1·65	6·93	13·23
Cleve	1·39	1·68	7·48	14·96
Cowell	0·44	1·02	5·06	11·06
Miltalie	1·12	1·36	9·68	13·75
Mangalo	0·78	1·55	5·95	13·86
Darke's Peak	1·58	1·80	9·28	15·24
Kimba	1·34	1·42	6·05	11·84
YORKE PENINSULA.				
Wallaroo	0·93	1·56	8·20	13·97
Kadina	1·29	1·90	10·13	15·59
Moonta	0·77	1·82	8·11	15·04
Paskeville	1·38	1·84	8·75	15·44
Maitland	1·79	2·50	10·70	19·86
Ardrossan	0·98	1·55	8·98	13·96
Port Victoria	1·09	1·87	8·86	15·39
Curramulka	1·68	2·34	9·24	17·81
Minlaton	1·35	2·29	8·78	17·72
Port Vincent	1·00	1·69	6·67	14·37
Brentwood	1·86	2·04	10·55	15·61
Stansbury	1·19	2·18	8·11	16·81
Warooka	1·82	2·58	9·02	17·44
Yorketown	1·34	2·31	8·23	16·88
Edithburgh	0·93	2·14	7·21	16·38
SOUTH AND SOUTH-EAST.				
Cape Borda	3·08	4·20	16·51	24·87
Kingscote	2·43	3·01	10·88	19·27
Penneshaw	2·17	2·94	10·63	19·18
Victor Harbour	2·08	2·92	13·27	21·43
Port Elliot	1·83	2·62	11·30	19·94
Goolwa	1·92	2·31	11·21	17·84
Maggea	0·35	1·02	5·76	10·02
Copeville	0·54	1·00	6·43	11·51
Claypans	0·94	1·09	6·94	10·53
Meribah	1·20	1·20	4·98	11·11
Alawoona	0·92	1·12	5·94	10·26
Caliph	0·47	1·06	6·83	10·44
Mindarie	0·64	1·16	6·08	12·13
Sandalwood	0·70	1·35	6·47	13·60
Karoonda	0·58	1·35	6·44	14·18
Pinnaroo	0·96	1·37	5·13	14·19
Parilla	0·62	1·36	5·93	13·64
Lameroo	0·58	1·64	6·06	15·79
Parrakie	0·65	1·47	6·39	14·61
Geranium	0·53	1·75	7·26	16·39
Peake	0·63	1·67	7·94	15·95
Cooke's Plains	0·72	1·67	7·94	15·29
Coomandook	0·67	2·02	7·70	17·03
Coonalpyn	1·13	2·12	8·32	17·65
Tintinara	1·11	2·19	8·58	18·72
Keith	1·42	2·15	8·62	17·96
Bordertown	1·29	2·28	8·94	19·14
Wolseley	1·38	2·17	8·25	18·47
Frances	0·96	2·43	8·30	20·12
Naracoorte	1·13	2·81	9·99	22·65
Penola	2·10	3·27	11·16	25·94
Lucindale	1·80	3·30	13·69	23·47
Kingston	1·88	3·54	9·55	24·24
Robe	3·43	3·96	13·71	24·65
Beachport	3·37	4·46	13·07	27·07
Millicent	3·83	4·34	15·51	29·87
Kalangadoo	3·44	4·48	13·97	32·05
Mount Gambier	2·24	4·06	10·25	30·34

Agricultural Bureau of South Australia

Reports Received from Branches

The following is a list of the Branch reports received during the month, and shows the date and principal subject of each meeting:—Allendale East, 16th July, discussion. Appila Yarrowie 2nd July, annual meeting. Arthurton, 8th July, annual meeting, "Soil," L. B. Lamshed. Balaklava, 28th June, address, M. W. Aird. Balumbah, 7th July, annual meeting. Baroota, 14th June, "Wheat Pickling," F. McDougall; 12th July, annual meeting. Beetaloo Valley 21st June, annual meeting. Berri, 12th July, annual meeting. Blackheath, 24th June, paper from *Journal.* Black Springs, 22nd June, "Farm Poultry," E. Seigert; 20th July, papers, O. Kermode and W. Heinrich. Blewitt Springs, 22nd June, Field Day at Experimental Orchard; 20th July, annual meeting. Blyth, 30th June, address, E. J. Breakwell. Booleroo Centre, 25th June, "The Plough and Fallowing," T. H. Borgas. Brentwood, 12th July, annual meeting. Brownlow, 15th July, "New Zealand," R. C. Scott. Butler, 5th July, annual meeting. Cambrai, 7th July, annual meeting. Chilpuddie Rock, 30th June, discussion, "Seeding." Coomandook —25th June, discussion. Coonalpyn, 21st July. annual meeting. Delvin's Pound, 6th July, "Cultivation," R. L. Griffiths. Eurelia, 30th June, annual meeting, "Wheat Pickling," E. P. Wall. Frayville, 29th June, "Pasture Improvement," R. L. Griffiths. Glencoe, 6th July, annual meeting. Goode, 23rd June, discussion, "Early Wheat Varieties." Greenock, 19th July, annual meeting. Hartley, 23rd June, "Incubation," W. J. Brook. Hilltown, 6th July, annual meeting. Inman Valley, 24th June, annual meeting, "Lessons from 1936," I. S. Anwyl; 15th July, address, L. J. Cook. Kelly, 3rd July, "Transport," J. S. Atkinson. Keyneton, 14th July, "New Zealand," R. C. Scott. Kingston, 19th June, papers, E. Goode and R. Vine; 19th July, papers, J. Legoe and R. Hope, jun. Koppio, 21st April, "The Forge on the Farm," F. Gardner; 16th June, discussion, Early Wheat Varieties, Kulkawirra, 13th July, discussion. Kyancutta, 6th July, "Kangaroo Island," R. P. Hall. Lameroo, 16th July, annual meeting. Laura Bay, 8th June, question box; 13th July, annual meeting. Lenswood and Forest Range, 26th July, annual meeting. McLaren Flat, 16th July, annual meeting. Miltalie 19th July, annual meeting. Monarto South, 17th July, "Manurial Requirements of Soils," W. Giles. Mount Hope, 22nd June, question box; 20th July, annual meeting, "Pasture and Ley Land," F. C. Gross. Mount Pleasant, 7th July, annual meeting. Murraminga, 3rd July, annual meeting. Nantawarra, 25th June, address, W. J. Spafford; 8th July, annual meeting. Nunkeri, 16th March, address, R. L. Griffiths, 2nd July, annual meeting. Parrakie, 9th July, "Entero-Toxaemia Vaccination," A. J. Beelitz. Paskeville, 19th July, annual meeting; "New Zealand," R. C. Scott. Penola, 9th July, annual meeting. Penwortham, 7th July, annual meeting. Pinkawillinie, 17th June, "Fencing," B. Hudson. Poochera, 6th July, annual meeting. Port Elliot, 24th July, annual meeting. Pygery, 22nd June, "The Need for a Farm Workshop," W. M. Heath: 20th July, "Farming Practices," W. H. Brownrigg. Red Hill, 20th July, "Livestock," O. Bowden. Renmark North and Chaffey, 15th June, "The Power of the Mind," M. Tregenza. Rosedale, 10th July, "Pruning, Budding, and Grafting," J. B. Ruediger; 20th July, "Agricultural Development," F. E. Waddy. Snowtown, 13th July, annual meeting, "Wool," C. A. Goddard. South Kilkerran, 5th July, annual meeting. Strathalbyn, 14th July, annual social. Summerfield, 9th July, papers, J. Bottroff, I. Paech. Sutherlands, 1st July, "Stud Breeding," J. A. J. Pfitzner. Tantanoola, 3rd July, annual meeting. Truro, 12th July, address, "Petroleum Industry." Upper Wakefield, 22nd July, papers, H. Gregor and C. F. Neumann. Wandearah, 29th June, discussion, "Dairy Cattle." Warcowie, 7th July, annual social. Warramboo, 1st July, "Electricity," O. J. Murphy. Willowie, 9th July, annual meeting. Wilmington, 20th July, annual meeting. Wudinna, 23rd July, Homestead Meeting. 25th June, annual meeting. Yandiah, 25th June, "Levers," A. H. Keller; 9th July, "Miscellaneous Meeting."

Papers Read at Conferences

Fodder Plants useful for increasing Stock carrying capacity of the district

[M. Lowe, Laura Bay (Ceduna Conference).]

In the selection of suitable plants, much has to be taken into consideration, and tests covering a number of years would be needed to prove which plants are most suitable and the management necessary to obtain best results. In this matter, if as many different farms as possible undertook to test plants which they think would be suitable, a great deal of information could be gained as to the performance of plants under the varying soil conditions which prevail in this district, and also under different forms of management.

In the past, the plants which have proved the most useful are Wimmera Rye Grass and Oats, the former being mixed with the natural grasses, and the latter as a sown pasture. Other plants which have possibilities under cultivation are Lucerne, Sorghum, and Mitchell Grass. However, so very little has been done in testing these perennial plants that nothing definite can be said as to whether they are an economic proposition. It may be found on testing that even if a plant will grow when once established, the cost of buying seeds and establishing the plants may be greater than the pastures obtained are worth.

Wimmera Rye-Grass.

Wimmera Rye-Grass has been grown for a number of years in this district. The general way of establishing it is to sow a small quantity with a wheat crop and then allow its own seeding to establish a thick stand. It generally grows much better where paddocks are cultivated fairly frequently. This method of establishing has one drawback, however; in obtaining seed from other districts, undesirable plants, such as Wild Turnip, may be introduced, and a close watch for these seeds cannot always be maintained.

Oats.

Oats have been grown for many years in this district, and in late years much use has been made of it as a sown pasture for stock. In this manner it has proved itself capable of increasing the carrying capacity to a remarkable degree. However, as there are many different varieties, considerable information can still be gained by a thorough test of the various varieties.

Lucerne.

Tests of lucerne in the district during recent years have proved that once established, this valuable plant will grow here even in dry years, making good progress. As these tests have consisted of sowing a few pounds of seed with the wheat crop, thereby scattering them over a large area, little has been done toward proving its full commercial value under varying conditions.

In this matter, a test that took place recently in New South Wales may be of interest, although full particulars as to the type of soil, &c., are not available.

Two plots were selected, the average annual rainfall being less than 12in. Plot A was sown with wheat to act as a cover crop, the lucerne seed being sown at the same time and mixed with the super used. This test is identical with the method generally advised by officers of the Department of Agriculture in this State. In this case, the stand obtained was very poor, the plants making very little growth. Plot B was sown with the same amount of lucerne seed per acre as Plot A, and on bare fallow. The stand obtained was thick, with a strong healthy growth of foliage, while it was found on examination that the depth of penetration of the root system was more than twice that of the plants in Plot A. It would therefore seem that the method adopted in Plot B is well worth trying out. For withstanding long, dry spells, a deep-root system is essential.

Sorghum.

Sorghum was grown in the early days of settlement of the Charra district on small plots for use as stock food. In the wetter districts where Sorghum is grown, it is looked upon as a valuable fodder, having a high feeding value, as well as producing a good bulk of feed. The fact that it has been grown in districts where the rainfall is very nearly the same as recorded in this district leads me to believe that it may, under some circumstances at least, prove itself to be well worth a thorough test.

Mitchell Grass.

Mitchell Grass is used extensively on a large number of stations in country very subject to drought, and although it is not classed as high in feeding value as some of the plants mentioned, it has proved of great value in many places by continuing to grow where other plants have failed through dry years.

A plant that will keep growing from year to year would be the most suitable for this district, owing to the erratic rainfall and the fact that annual-growing species get very little benefit from summer rains, and dry spells during their growing period give them so great a check that they do not respond when rain does fall.

The Care and Working of the Farm Team

[E. L. Miller, Mudamuckla (Ceduna Conference).]

Ample food and fresh drinking water are most necessary in the care and working of the farm team. No farmer should expect any animal to do a hard day's work on insufficient feed and unclean drinking water. While working the team at such times as seeding and harvest, the horses should be given good hard feed, such as hay chaff for morning feed, followed by hay chaff with oats added to it for dinner, and at night a small ration of chaff and a feed of long hay. Every farmer should endeavour to produce a haystack for his team. Those farmers who do not bother, or are not fortunate in having a haystack and feed cocky chaff, should add wheat or oats liberally; that is, when the animals have become accustomed to the grain. Horses at all times should have access to water whenever they require it.

The stable should, if possible, be situated on a slope to assure good drainage, and should face the east to get the morning sun. I favour an iron-roofed stable built fairly high, with one width of iron running lengthways along the back and front at the top, with stakes from the ground to the bottom of the sheet of iron along the back. This allows fresh air to pass through the stable constantly.

A separate stall should be allotted to each horse, so that it can be either tied up or shut in. There is nothing worse than to see horses biting and kicking each other in the stable. If they are running loose, the result is that one finds a horse lame or one that has been bitten on the shoulder or has been hurt in some other way. If a team has its allotted stalls and is shut in, each horse gets a proper feed.

One very important factor that should never be neglected is the grooming of the team. Dirt and sweat marks of the previous day's work should be groomed off the shoulders, especially before the team leaves the stable in the morning.

Where the team has just been yarded after a spell of a few weeks from the harvest, seeding or fallowing, the animals have lost their hardiness and are soft, and also tender on the shoulders. It is at this time that great care is necessary in preventing scalds and sore shoulders. Firstly take a look at the harness. Has each horse its own winkers, collars and harness? Are they well oiled and in good order, particularly the collars? Some farmers tell one horses's collar from the other by the holes that have been cut in the lining to fit over a scald or a sore. Certainly one may come in contact with a horse that has very tender shoulders and is difficult to heal, but the majority of the horses in one's team or stable can be worked constantly throughout a seeding, fallowing or harvest operation without getting sore if cared for properly. Groomed and with well-fitted harness, the team enters the paddock for a day's work feeling full of energy after their spell. This may last a week, perhaps a fortnight, and then one sees that changes have been made in the team, because of a scalded or sore shoulder. This can be avoided by nursing the team a little during that very first week or fortnight they go into the chains, and not only for a short period, but probably for the entire operation the team is engaged in. The first week the team is put to its task is one of great care of the horses' shoulders. After a spell it is only natural that the team will perspire freely, and if not cared for will scald very easily. This may be the start of a bad shoulder throughout the whole seeding operation. If the team is taken as quietly and steadily as possible, stopping at each round when coming into the wind, and raising the collars to allow the horses' shoulders to cool off, such treatment will help to prevent that unpleasantness of having to cut the lining of the collar to fit a sore. A small drum of water should be out in the paddock to wash down the horses' shoulders immediately the chains are dropped. This system may not be a preventive of sore shoulders for every horse, but the majority will respond to the care and attention given by a patient lover of horses. The few minutes' care one pays to his team each day of that first week or fortnight will probably save hours and perhaps days before the work is done.

Breakwinds and Hedges for Farms

[P. J. Curnow, Wirrabara (Upper North Conference).]

In travelling about the settled areas of this State, a visitor is impressed by the barren appearance of farm homesteads and the absence of shelter for stock in many grazing paddocks. The original selectors of many farms failed to realise the importance of leaving even a few specimens of the indigenous timber when clearing the land to bring it under cultivation. In many parts of the North, fine native Pine Trees, Box, Peppermint, and good specimens of Mallee were growing in abundance. A little foresight on the part of the selector should have convinced him that some provision for the future should be made. Even to-day some farm homes set in a clump of mallee or other native trees have a much more attractive and comfortable appearance than those without even one tree to take from the home that barren appearance with which folk in the North are so well acquainted.

With the object of encouraging men on the land to plant trees as a means of providing shelter both for homesteads and for stock in grazing paddocks, the State Forest Department for over 40 years distributed many varieties of trees without cost to the recipient. Many thousands of trees were sent out from the State Nurseries to all parts of the older settled areas of this State every year. Where are those trees to-day? With the exception of a few gum trees—mostly poor type Sugar Gums—few trees so distributed remain to-day, except in some more favoured localities.

Many of the older farmers realised the importance of planting trees for shelter of the homestead and stock in grazing paddocks. To the writer's personal knowledge some of these early cultivators went to considerable trouble and expense in preparing the land for tree planting and in the after care of the trees. Wherein then lay the failure to establish the trees so planted? The answer is simple. In the cycle of good or wet years, trees grew well. In the inevitable cycle of dry years which always follows under our climatic conditions—years when no subsoil rains occur —planted trees either died out or became poor, stunted specimens. Unfortunately, many varieties of trees distributed by the Forest Department were quite unsuited to the dry North conditions. Varieties such as Poplars, Willows, Elms, and even some varieties of Pines, proved of no value under the harsh summer conditions, and naturally failed. While the Sugar Gum is hardy and is suited to most farm planting, and although it is an attractive tree while young, it becomes an unsuitable type as it grows older. Its habit of shedding its lower limbs as it grows upward lessens its value as a real breakwind variety.

The *Insignis* Pine is a good shelter tree on suitable loamy soil, but it must not be planted in windy, exposed sites, as it is liable to serious injury in heavy winds. The swaying of the tree under windy conditions causes the bark to bruise at ground level and the death of the tree. The Stone Pine is hardier, and the two other common varieties, *Pinus maritima* and *halepensis*, are worth trying, except under the very driest conditions.

Which, then, is the most suitable tree for farm planting? In the writer's opinion, for the average Northern farm, no other imported tree compares with the Pepper Tree for sheer hardiness and shelter suitability. During the recent drought years no tree has stood up to the harsh Northern conditions like this variety. The writer noticed Pepper Trees in Wirrabara in January and February, five years ago, after two years of low rainfall and over half a year without any rain at all, putting out new fresh growth, when even old Gum Trees were showing the effects of no subsoil rain for the two previous years.

The Pepper Tree has many good traits. It may be easily raised from seed, is a quick grower, is very hardy when once established, and particularly is it suited as a breakwind, for when stock cannot destroy the lower branches it will retain its bottom limbs indefinitely. These limbs grow outwards as the tree develops. Where a double row, or better still, three rows can be planted, a fine protection for a homestead against prevailing winds may be obtained at little expense. To give the trees every chance, a strip of land of a suitable width should be ploughed deeply and the area fenced permanently and netted against fowls and young stock. A breakwind composed of these trees, if planted in the good or wet year cycle, will stand a reasonable amount of drought without failure.

There are many kinds of trees that may be used as farm breakwinds. Rainfall and locality are the governing factors in their selection. Amongst those that may be mentioned are the Kurrajong, Tree Lucerne, Carob, Campho, Laurel, various types of Cypress, although some forms of the latter die out after a few years' growth, and quite a number of the lower growing Gum Trees are worth trying. These may be found in nurserymen's catalogues.

The following plan is recommended by the writer for the raising of Pepper Tree and other varieties of tree seed: Procure lever-lid tins (a 2lbs. treacle tin) and push the lever lid on tightly. Cut the original bottom from the tin, making this the top. Punch a few holes in the lever lid for drainage. Place small stones, or better still, some charcoal, in bottom of tin. Fill tin with sandy, loamy soil and place two or three seeds in each tin. Cover lightly. Place all tins in a sheltered corner in a box, and keep seeds damp until they germinate. Keep plants well watered in dry weather. Leave only one plant in each tin. When large enough, plant out after danger from frost is past. To plant, merely remove the lever lid carefully to not disturb the roots. Place tin, as it is, in prepared land. Tread lightly but firmly, and give each plant a watering.

The man who seriously wants to beautify his home and to give it shelter from winter winds will attend to the young plants carefully. A watering now and then during dry periods will help to win success.

Kaffir Apple—A useful hedge plant.

Hedges.

In addition to planting shelter trees, a farmer—on most farms, except those under most adverse conditions—may add to the appearance of his homestead by surrounding his home with a well-established hedge. Not only does a hedge add to the attractiveness of the home, but it serves a useful purpose, in a large measure, in protecting the house from wind and dust. Much protection, too, is given by a high hedge to a fruit or flower garden. A well-clipped hedge can be made a valuable asset to the home.

In selecting suitable hedge plants for Northern conditions, one is again confronted with a difficult problem. Around the city many types of beautiful hedges may be seen. With a good water supply to force young hedge plants into quick and active growth, it is a simple problem. Varieties such *Cupressus Lambertiana, C. torulosus, Coprosma lucida,* Native Myrtle, *Rhamnus,* Yellow Broom, and many others would be quite useless in the North unless water was available in summer. In favourable years, *Coprosma* and Native Myrtle may be established. The former soon suffers if dry seasons supervene.

Which plant, then, makes the best hedge suited to our long, dry summers? Without exception, the common Olive is the hardiest of all hedge plants. The plant is a native of dry, hot countries, and will stand up to harsh conditions without injury over protracted dry periods. It has only one drawback. It is slow growing. On the other hand, once it becomes established, it will withstand neglect—so far as cultivation is concerned—unlike any other hedge plant. Beyond a good clipping once or twice a year, no other attention is required. If plants are to be set out along a fence where no other adjoining cultivation will take place, such as the cultivation of a farm orchard or flower garden, the land should be broken up 3ft. wide. The top soil should be removed and the bottom soil broken up to the depth of a digging fork. Replace surface soil and plant the young plants 2ft. to 3ft. apart. Two-year old plants are young enough to put out. If young olives are kept hoed and an occasional watering is given during the first summer, success should attend the planter's efforts.

Clipping the young olives should be undertaken from the beginning. When from 18in. high, all plants should be cut to the one level, and the hedge slowly formed to force out the lower growths. At five to six years old, the hedge should reach the top of an ordinary fence.

Other hardy plants for hedges are Kaffir Apple—a very thorny plant—Privet and *Tecoma capensis*. In the more favoured localities, *Coprosma* makes a good hedge and will stand a lot of hard clipping.

The writer suggests that as the district has had more than a fair share of dry seasons, the time must be approaching when better conditions should prevail. During the wetter years is the time to plant breakwinds and hedges.

The Destruction of Noxious Weeds

[C. Giddings, Yandiah (Upper North Conference).]

Noxious weeds should be dealt with more severely than they are in most cases. One has only to look around roads to see that this problem is being overlooked. If people are not going to destroy them now, what will weeds be like in years to come? It is a failing of the councils not to plead with farmers and landholders to destroy these pests as much as possible. In some cases it is practically past totally destroying them, but in most instances one can at least keep them down instead of allowing them to spread.

Public reserves are great places for these weeds to grow. The Government should pay men to destroy them in such cases. If the reserves grow Star Thistles, as they are mostly doing now, people are not going to pay registration for their cattle to get their legs matted and pricked with thistles. Another thing that is noticed when travelling is that one side of the road will be practically free from weeds and the other smothered, because one man has destroyed the weeds and the other has ignored them. If the man who does not dig his weeds cannot cope with them, it would pay him in the long run to employ labour for that purpose.

When carting hay, it is a good plan to take a hoe and destroy the weeds around the fences. Great care should be taken when digging weeds to see that all the roots are removed. If only the top is taken off, the plants grow again and develop seeds.

The Bathurst Burr is spreading and, if not checked, will be very troublesome These come at a much more convenient time and should be dealt with severely, as they seem to thrive after summer rains.

The Fox Weed (Sand Rocket) is very hard to control. On one road it has spread from seven to eight miles in about 12 months. Although cattle and sheep eat it, it thins out a crop. It also does exceptionally well after summer rains, and it seems to seed all the year round. A good way to treat it when it is too thick to dig is to cover the plants with straw, allow them to grow through the straw, and burn while green. When digging these weeds, be particularly careful not to leave a single root in the ground, or cover up another one, otherwise they will grow on just the same.

Three-corner jack is another bad weed which spreads quickly; treatment the same as for Fox Weed is very effective.

Horehound—another bad weed—should be dug up and burnt. There are many other weeds such as Wild Turnip, Wild Onion, Squash and Paddy Melons which should be kept down as much as possible. If they become too thick to dig or cultivate, the harrows will kill quite a lot of them.

The Plough, Fallowing and Treatment of Fallows

[T. H. Borgas, Booleroo Centre (Upper North Conference).]

The Plough.

To-day there are many different makes on the market. When buying a plough, many things should be taken into consideration. First, the main frame. Most plough manufacturers make the frames too weak across the centre and yet the owners in many cases are not aware of this until shown. This applies mostly to ploughs of five furrows and over. The main cause for complaint is that the near-side bar of the frame on most ploughs is run back to the centre of the plough, whereas it should run from the frame at the near-side front wheel to the frame at the near-side back wheel. Hence, most ploughs are weak across the centre.

Plough Sagging or going Down in Centre.

This is quite a common cause of complaint, and the longer the plough so much sooner will it sag—a fact that has always been noticeable, and more so with skim-ploughs. These have been seen down in the centre to the extent of over 1in. This could be successfully remedied by putting a stay along under the main frame, say, a ⅜in. round iron bar with an eye at both ends—preferably to an eye at one end and a thread and nut at the other, as this is not nearly so effective. This bar with an eye or holes at both ends should have a post in the centre of the plough that passes through the plate fixed to the main frame. The post should have a nut at the top and bottom of the plate so that one could adjust the main frame up or down as required. This idea should be very effective and, though I have not used it on a plough, I have used it with success on a combine frame; in fact, I could drive up the frame of a combine until it looked like a half-moon. This bar or stay should be kept up as near as possible to the frame so that it will not interfere with stubble or other rubbish going through the plough. The tension arm or bridle on the draught should be slightly forward to get the best jumping and leverage from the plough. Modern ploughs have very good devices for the dipping or raising of the feet. A new plough is generally set to work with new shares, and it works fairly well until the gripping edge on the shares is gone, or perhaps the ground is getting hard and the plough rises and slips over. At this stage, the feet should be given a little more dip. Many people argue in favour of the heavy plough, but I prefer a light plough properly set, providing conditions are not too rough. Another common complaint is that ploughs do not follow the horses with a full cut as they should do in undulating country. I have successfully remedied this on ploughs by heating the front feet and bringing the share point a little more to the near front foot ¼in., second foot ⅛in., and third, straight. This job requires care and understanding. When this is done and having such a steering gear, it is a pleasure to drive, as one has always a full cut without pulling the horses about. This is a horse and hand steering combined, and the result is square corners and no "pig troughs." Every plough should have a separate lever to raise the front, or at least off-side the front of the plough because nine out of 10 times ploughs have their front foot strained under. This always happens when turning too short round, and not having the plough sufficiently raised at the front. With a foot strained, a plough will not do even work. Also, too much care cannot be exercised in the toes of a plough. They should never scrape on the ground or metal roads when the plough is being shifted about, for nothing is more annoying than to have the shares kicked off at every little rut, and the plough not doing an even job. A worn foot will allow the point of a new share to go down, and when the share's gripping edge is gone it allows it to come up, and so causes uneven work. It is well to remember that the cost of doing up one toe is more than 20 shares.

Fallowing.

Strange to say, fallowing since its inception has been done with the mould-board plough. In the early days, ploughing anything from 6in. to 1ft. deep was quite common, but nowadays deep ploughing is a thing of the past. Three inches or even less in certain soils is deep enough, particularly in our district. Shallow ploughing does not bury weed seeds so deeply, thus giving them a better chance to germinate and getting them worked off before seeding time begins. This applies particularly to fallow that is cultivated, for here the weed seeds are left practically on top. Generally speaking, when starting to plough a field, the earth is thrown towards the fence; thus, after working it several times in this way, a bank is formed along the fence. A good plan to reduce this bank is to plough back away from the fence every third fallowing or so. When finishing off, say, a four-cornered block, it should be worked down to the width that the headlands will be made before going down them. Then if ploughing the headlands, "gee-off" round, go down the right hand one first, then the left, then up the block, and likewise at the other end of the block, continuing in this manner. When the block is done, the headlands also should be finished. If doing headlands, "come here" around, work the block down the same as above, go down the left side headland first, then the right, and the same at the other end. It is far better to go an extra round on headlands with the plough at half-depth furrow than to leave a deep furrow when finished off. The same applies to the last time up the block. Never leave a deep furrow when finishing off or turning on ploughed land. Always try and avoid banks and deep furrows.

THE PREPARING OF THE FALLOWS.

Having finished fallowing, the next job is harrowing. If the land is of a tight or settling nature, harrow late. If it is loamy and it is desired to have it set, harrow as soon as possible after fallowing. All harrowing should be done after suitable rains. The fallow should then be left to rest awhile to give any substance time to decay. In spring, all fallows that have sufficiently set should be cultivated. Not only does this help to conserve moisture already there, but also it takes in more of future rains. Fallow contains its maximum percentage of moisture in spring, and this is the period when evaporating agencies become active. Any delay in breaking up the surface results in a serious loss of moisture. Two things have to be kept in mind in working fallow in summer—first, the preservation of an effective surface mulch, and secondly, the preparation of a seed bed that will afford the most favourable conditions for the germination of seed and growth of the crop. Working the soil in summer is not recommended, unless rain has destroyed the mulch, in which case it should be restored. It is not advisable to work fallow when too dry, as little benefit (if any) will result. The most suitable time for cultivation is soon after rain has fallen. It can be definitely stated that, other things being equal, fallow receiving a sufficient number of workings will produce a heavier yield than one that did not receive so many. Although it is not necessary to cultivate or harrow after every fall of rain during summer, certainly no harm is done by working after every fall sufficiently heavy to form a surface crust.

Butterfat Prices

[S. G. McCALLUM, Willowie (Upper North Conference).]

Our dairy people, especially those who supply cream to the factories, are getting next to nothing for their labours. The figures I quote are taken from our experience. During January, February, and March we had an abundance of summer feed and were milking six quite average dairy cows. During these months the average net price of butterfat was 10½d. The factory credited us with 325lbs. of butterfat. Allowing 25lbs. per month for home consumption in milk, cream and butter would total 400lbs. of butterfat in 13 weeks (a little over 5lbs. butterfat per week per cow), equal to nearly 31lbs. per week at 10½d.—a financial return of approximately 27s. per week. To receive this return it is necessary to own seven cows valued at £5 per head, a separator, buckets, &c., valued at £25, making an outlay of £60, interest at 5 per cent., and with £3 per year depreciation on stock and plant at 10 per cent. £6 per year, seven cows' paddocking at 1s. 6d. per head 10s. 6d. per week, about £27 per year, making a total expense per year of £36, or approximately 14s. per week. Deduct this from the return of 27s. and you get 13s.

The actual hours of labour per day are as follows:—Milking—Morning 1 hour, night 1 hour, 2 hours. Separating and cleaning—Morning ¾ hour, night ¾ hour, 1½ hours. Bringing cows in from paddock ½ hour—4 hours per day, 28 hours per week—or 3½ days of eight hours each. Dividing the profit of 13s. by 28 hours gives a return of 5½d. per hour. The present arbitration award is for a 44-hour week, so that the dairyman receives £1 0s. 2d. for his week's work, as against the worker's wage of between £3 and £4 per week. Why do people continue to work on these lines? It is simply because the weekly or fortnightly cream cheque is a necessity. Many country homes have to depend on cream money for the bare necessities in the home. I have also been privileged to compare another party's butter factory return and it is practically the same as our own. A great proportion of milking in the country is done by women and children.

We have sought every possible means of knowing how to maintain first quality cream, and have been confounded by the returns received. It was reported that two inspectors visited a factory and spent the day making a certain percentage of second quality cream. Then they told the manager he would be required to keep up that percentage. This is not right. Any one day's cream might easily be much better or worse than another. If a manager is not capable of classing the cream satisfactorily, then the inspectors should test every can and not ask for percentages. It is a wrong principle to allow any important decision in the hands of one who is not interested and who will not lose by mistakes. If we cannot produce butter of the finest quality, let us acknowledge its true quality and sell it as such. By so doing we will most probably receive a better net return for it, for the finest quality article invariably costs more to produce. Dairying people should be allowed some means whereby they can check the decision of inspectors and managers. We might be given the privilege of an interested dairyman, who himself would lose or profit by the grading of cream and who would be qualified to grade and test cream and follow the managers and inspectors. In this way we would be able to check off the true position, and much more satisfaction would be maintained.

The Soya Bean

[Paper prepared for the Upper North Conference.]

[A. M. Ware (Wepowie).]

Information collected from various Agricultural Departments of the States of Australia.

Some day in the future the Soya Bean may find a place in the paddocks of Australian farmers. In Europe, Asia, and the United States, this bean is yielding substitutes for milk, cream, and cheese, as well as oils for enamels, lubricants and foundry work. This same bean is among the richest of the known vegetables and forms the staple diet for tens of millions of people in the Eastern Asiatic countries.

For centuries the Soya Bean has occupied an important position as a good crop in China and Japan. These and the adjacent countries are the chief centres of production. The value of the plant is now securing wider recognition, and its cultivation is extending to Southern Europe and the United States of America. It has been stated that the main value of Manchuria to Japan is primarily as a source of cheap and ready food supply; incidentally, most of Manchuria's cultivated land is devoted to the production of Soya Beans.

Since 1907 these beans have been growing in importance as a commodity for export all over the world. Great Britain, for example, imported 160,000 tons in 1935, while Germany's importations for 1934 amounted to no less than one million tons.

The Soya Bean is an erect-gowing, annual, leguminous plant, the leaves resembling those of ordinary beans or cowpeas. There are numerous varieties, varying considerably in height, character of foliage, and the colour of seed, which may be yellow, green, brown, black, or a combination of these colours.

The fodder value of the plant, in a well-grown sample, equals that of lucerne. The tall-growing varieties, Biloxi and Otootan, have given the best results for hay and fodder purposes, the former possessing a strong, erect growth, carrying dense foliage and reaching to a height of over 5 feet on the richer soils in Queensland.

While the Soya Bean is suited to a fairly wide range of soils, it prefers the loamy type, such as are best suited for maize, and although benefiting from ample supplies of soil moisture, it will stand dry conditions much better than maize. The land should be ploughed to a depth of 8 inches in the winter and allowed to lie in a rough state until spring, when a second ploughing is given. Thorough cultivation and harrowing is then advisable to form a good seed bed prior to sowing.

The dwarf growing varieties may be sown in drills 2ft. 6in. apart, increasing the distance to 4 feet apart for tall kinds like Biloxi. A 3ft. 6in. spacing with the plants 8 to 10 inches apart, will require about 16lb. of seed per acre. The usual inter-row cultivation is necessary to check weed growth and maintain a surface mulch.

Harvesting is usually effected with a mower or side delivery harvester. For hay purposes the crop is cut before the seed is mature, and handled in the same manner as cowpea hay to preserve the leaf. Where seed is the main consideration, cutting is delayed until the beans approach maturity, but it takes place before any shelling out occurs. When carting to the thresher, waggons are lined with bag sheets or tarpaulins to minimise loss.

Soil inoculation is an interesting point in connection with the Soya Bea. It has long been known that certain bacteria must be present in the soil to enable legumes to make use of atmospheric nitrogen. Where the bacteria are absent or are insufficient, growth is improved by treating the seed with a culture of nitrogen-fixing bacteria prior to sowing. Some important increases in yield and nitrogen content have resulted from this treatment, notably in U.S.A., where Soya Beans promise to become an important crop. In the chief producing districts in which the beans are taking the place of oats in the cropping system, the rotation is maize, Soya Beans, wheat, and clover.

The beans are largely used for the extraction of oil, the residual oil cake being fed to stock. Soya Bean oil can be used for a number of purposes for which linseed, cottonseed, and cocoanut oils are now utilised.

Use as Human Food.

It is as a valuable addition to our everyday diet that Soya Beans are likely to be most utilised. "The Soya Bean and the New Soya Flour" clearly show the remarkably high nutritive value of this plant.

("The Soya Bean and the New Soya Flour"—C. F. Ferree's).

Soya flour containing approximately 40 per cent. protein, 20 per cent. fat, valuable phosphates and potassium, together with the important vitamins A, B, and D, is the best obtainable vegetable substitute for meat. In the chief producing countries, Manchuria, China, and Japan, it is an esteemed article of diet, forming the basis of various food preparations. In Japan a Soya milk is made, the analysis of which compares favourably with cow's milk. Soya sauces are also in general use.

Owing to the high fat content, some difficulty was experienced in making a flour that would keep sufficiently long. This difficulty has been overcome by the "Berizellers" process, which produces a satisfactory flour that will keep.

Comparison of Soya, Wheat and Oats.

Food.	Water.	Protein.	Fat.	Carbohydrate.	Fibre.	Ash.
	%	%	%	%	%	%
Wheaten Flour	13·37	10·21	0·84	74·71	0·29	0·48
Oatmeal	9·65	13·44	5·92	67·01	1·86	2·12
Soya Flour	8·33	42·84	20·00	19·35	4·79	4·69

Illustrating Calories Per Lb.

Food.	Protein.	Fat.	Carbohydrate.	Water.	Calories Per Lb.
	%	%	%	%	%
Soya Flour	42·0	20·0	24·0	9·0	2,165
Wheat	12·2	1·7	73·7	10·6	1,750
Beef Steak	18·6	18·5	—	61·9	1,130
Eggs	14·8	10·5	—	73·7	720
Potatoes...........................	1·3	0·1	14·2	84·7	295

This flour contains four times as much protein and fifteen times as much fat as wheaten flour. This opens up great possibilities for its mixture with wheaten flour for bread-making in order to produce a more nutritive loaf. Owing to the abundant production of wheat, oats, maize, and barley in Australia, the establishment of the Soya Bean for flour-making purposes is likely to be slow.

However, in view of the plant's high nutritive value as a foodstuff, as fodder for stock, and as a soil renovator in crop rotations, no excuse is needed for drawing the attention of our farming community to its potential possibilities.

The present market for Soya Beans in Australia is limited, and is supplied by importations from Manchuria and Japan. Therefore, it is not suggested that farmers should engage in large scale production until the demand increases, but rather that small areas should be grown chiefly for home use. In this way growers will become familiar with the plant, and will be ready to take advantage of any improved marketing conditions.

Experiments with the Soya Bean in Australia.

South Australia.—No departmental experiments could be traced. South Australian summer rains deemed insufficient.

Western Australia.—Experiments carried out in Western Australia proved that summer conditions in that State were quite unsuitable for successful production of Soya Beans.

Victoria.—Experiments proved that the Soya Bean could be grown under Victorian conditions both with and without bacteria culture inoculation. During 1936 season excellent crops of 19 varieties of beans were produced at Myrtleford, Victoria, under irrigation (overhead spray.)

Conditions were very favourable, and estimated hay yield per acre was from 2 to 3 tons. Nothing further than above done in regard to crop in Victoria. Found that plants are very sensitive to frosts in all growing states.

Queensland.—Experiments mainly for fodder value; found that cowpea superior in Queensland, being more adaptable to tropical conditions. Seed producing experiments being carried on.

New South Wales.—Experiments have been carried on by New South Wales Agricultural Department for many years. Has been found impossible to establish the bean commercially in New South Wales. Growth presented no difficulty on coastal districts, but setting of seed in these districts is very unsatisfactory. Best seed setting area on the northern tablelands, but rabbits and hares have a particular fondness for this crop, and very little of the tablelands area is netted. Experiments with inoculums of Soya Bean bacteria imported from U.S.A. have given slightly increased yields of seed.

Sheep Dipping and Dips

[W. R. TRESTRAIL, Coomandook (Karoonda Conference).]

Statistics just published by the Commonwealth Statistician show that sheep are coming in favour more and more each year on Mallee farms. In the Murray Mallee Division 1,330 of the 2,125 wheat farms carried sheep with 421,538 out of the total of 596,193 sheep, thus proving that sheep are no mere sideline and no established Mallee farm can be called complete or up-to-date that does not carry its quota of sheep.

Apart from shearing and crutching, probably the most important operation is that of dipping. Although this may not be compulsory in certain parts of this district, except where flocks are infested with lice or tick, the operation should be carried out every year by all farmers.

The importance of dipping can be scarcely overestimated. In the drier districts not much trouble will be found with tick or lice, but one should always be prepared. It may be that these pests will be introduced to a farm by the purchasing of stock that may be slightly affected, and thus the trouble may start. The loss that takes place by not dipping is serious. Tick can be plainly seen, but lice may exist and not be seen. The insect is very small, no larger than a flea, and light-flesh coloured, and they are right on the skin and are not seen readily; but the observant man will notice the animal rubbing itself continually. If the wool on the sides is uneven and straggly, and wool is found on posts, bushes, or trees, it can be safely said that the sheep are lousy.

A long-woolled half-bred sheep may lose several pounds of wool actually rubbed off. The sides and the shoulder where the best wool grows often show less wool than the back because it has been rubbed off. This is not the whole story as the remainder of the fleece is injured, and is not nearly so attractive or valuable; and the sheep is very seriously retarded by constant irritation. Dipping costs little, improves the quality and quantity of the fleece, and helps to keep the blowfly in check. To dip spells profit; not to dip—even if the sheep are "clean"—is loss. The louse is a biting insect, and lives on the skin—usually around the neck and shoulders. It is extremely prolific, the eggs, which hatch in 5 to 7 days, being laid in the wool. The life cycle is complete in about 18 days. The tick is a blood sucker which may be found either in the wool or on the skin. The young tick develops in 20 to 25 days, and emerging from the pupa, reaches sexual maturity 4 to 5 days later, and deposits further pupae in about 14 days. The life cycle is complete in about 40 days.

Dips.

Every farm should have its own dip. There is no need to make a big affair, but one that will hold from 300 to 400galls. of dip. The following *inside* measurements will prove suitable for the average farm. Top of dip, 17ft. Bottom of dip, 7ft.; slope up from bottom 11ft. to be grooved or stepped so that the animals may get into the draining pen easily. The dip should be 5ft. deep and the width 21in. at the top and 8in. at the bottom. The wall should be 6 or 8in. above the level of the ground. When this is filled with 4ft. 6in. of water it will hold from 300 to 350galls. of dip. The first time the dip is filled the water should be carefully measured and a mark of a distinct nature made on the walls at every 100 gallons, so that it will be known just what quantity of dip to use when replenishing, etc. The structure can be built of concrete or masonry and cemented over. The draining pen should be at least 12ft. x 12ft., well cemented and sloped so that the dip will run back into the bath. It is advisable to cover the floor of the draining pen with old bags, so that the sharp feet of the sheep will not do so much damage to the floor.

A small narrow pen should be erected against the dip to hold not more than 40 sheep. A decoy tied up should be used to entice the sheep into the pen. Immediately against the dip, concrete should be put down to avoid the dragging of dirt or sand into the dip. Also a gentle slope at this point of the dip will assist in placing the sheep into the bath. There should be an intermediate yard from the main yard to the dip yard, and it is a good plan to have this fitted with some type of sheep-proof swing gate. The fence on this yard should be on an angle leading to the dip yard. This is all conducive to getting the sheep into the dip, as the more convenient the arrangements the easier the work.

The best time for dipping is about a month or so after shearing, when the wool will be sufficiently long to hold the dip to combat the pest. The longer the wool the more dip it will take. A cloudy, warm day is the best time for dipping, and all work should be finished by 4 p.m. at the latest; the earlier the better. Do not hurry the work. In a short dip, it is well to have someone to steady the sheep in the dip, so that they remain a good minute and get a thorough soaking. Sheep should be yarded over night, so that they will not be full and thus foul the dip. If the sheep are dipped on a warm to hot day, let them have a drink before starting. In the draining and drying, a shade of some sort should be provided. Put them in a stable or shed for a while. All lambs should be separated from their mothers and not allowed to suck for a couple of hours after dipping. Mix a powder dip the night before using to ensure a thorough mixing of the powder with the water. If using hard water, washing soda should be added, or some water softener, such as extract of soap.

The regulations for dipping sheep in South Australia are that all sheep within the proclaimed area "must, between the period of first September in every year and the end of January in the following year, be dipped by wholly immersing them for a period of not less than one minute in an arsenical dip containing not less than 0.1 per cent. of arsenious oxide." The following dips comply with the above formula if mixed according to the directions on the tin or packet:—Bickford's Sheep Dip Powder, Cooper's Sheep Dip Powder, Cresco Sheep Dip, Dytic Fluid Arsenical Sheep Dip, Edwards' Sheep Dipping Powder, Lan-o-Leen Arsenical Sheep Dip, Little's Tripolvos Sheep Dip, Little's Patent Powder Dip, Little's Poisonous Liquid Sheep Dip, Immunol Sheep Dip—Fluid and Powder, Imperial Sheep Dip, Pestkill Sheep Dip, Quibell's Powder Sheep Dip, Royal Sheep Dip, Sickle Powder Sheep Dip, Tic-toc Sheep Dip, Udip, Vacdip, Vallo Sheep Dip, Young's Arsenical Sheep Dip Powder. If any dip is used, the name of which does not appear in this list, inquiries from reliable sources should be made to see if the dip meets the requirements of the Act. On any farm a dip can be put down, and if so, it will be a valuable asset, and will save sheep from having to travel distances for dipping.

The Farm Labourer

[A. L. BURTON, Yurgo (Karoonda Conference).]

Care and management has been the title of innumerable papers read at the various Bureaux throughout the State, but as a rule, these papers dealt with the care of horse, cow, pig, or some other branch of agriculture, but I have not read one dealing with the farmhand.

Most farmers will admit that a good farmhand is as big an asset to the farmer as is his prize Jersey cow, or Percheron horse, and being an asset, he should have a certain amount of attention.

Of recent years, owing to a shortage of men, he has had to accept anyone offered Nevertheless, a certain amount of selection is essential until the farmer has a hand who suits his requirements. In most cases, even if a man is not an experienced hand, he is willing to learn. Though the actual care of a labourer is to a great extent in the hands of the women folk, it is the farmer's duty to see that the care is adequate. The housing of farmhands has improved greatly during the past 10 years, and there are very few cases where the "hand" has to rough it, as was the case during the early development of this country. Meals served on a farm are, as a rule, excellent, and it is doubtful if any working man has more variety in his foodstuffs, but it is the delay in serving the meals that often causes discontent among farmhands. A farmer should see that the man does not have to wait more than a reasonable time for his meal. The tea hour is the cause of most delays, and when a man has had a day in the paddock and has to wait an hour or so for his tea, he becomes dissatisfied.

Another matter relating to meals is the practice of making the farmhand eat on his own. Happily, none of this class distinction occurs in the Mallee. It is not suggested that the farmhand should have the run of the house, but he should be treated as an equal.

His Management.

Management can be divided into three parts; they are:—(1) Getting the labourer to take an interest in the farm; (2) trusting him with various work; (3) taking an interest in his interests.

The fact that a labourer sometimes does not take any interest in the farm is very often caused by the farmer not giving him a chance. Be prepared to ask his opinion of any job that is to be done. There is no need to follow any of his suggestions, but he may bring to light some new idea, and apart from that, he gathers the impression that his employer thinks his opinion is worth considering. Naturally he starts looking for ways to improve various jobs, and will soon be taking as much interest in the farm as the owner.

Most farmers can recall the first time they drove a big team, and the sinking sensation when they just missed the gatepost. Unfortunately, I was rather unlucky. I had never handled more than 2 horses when the boss asked me to drive a 10-horse team with a plough attached, through what looked to me to be a particularly narrow gate. I got the team moving across the yard, and was just gathering confidence when the boss yelled "Gee-off." Apart from giving me a fright, it gave my confidence a knock, and with the boss "Geeing-off" and "coming-here" I took the gatepost and a chain or so of fence with me in sheer terror. Interference of this sort is a common fault with farmers. They will not trust their men to do the job as they tell them to do it. If I had been left alone I would have, in all probability, negotiated the gate all right, but the presence of the boss makes the farmhand self-conscious, especially if he is handling a team for the first time. It is suggested that the farmer, when putting a labourer on an implement to which he is unaccustomed, should explain carefully the working of the machine and ask him to repeat his instructions. Let him do a round on his own; if he develops any faults, the farmer can correct him. Asking a man to repeat his instructions is essential. An easy way to test a new hand who says he can handle a team is to ask him to assemble a 9-horse set of swings. If he can handle the job, it shows he knows something of team work.

In reference to taking an interest in the farm labourer's interests, this is caused through lack of thought on the farmer's part. Farmers are notorious for talking shop, not that this detracts anything from the farmers themselves; on the contrary it shows that they really have their whole heart in the occupation, but it is sometimes as well to consider the "hand's" point of view. If a labourer gets nothing but farm work from morning until night, naturally he will become bored with anything pertaining to the farm; consequently he will start to lose interest and his work will suffer. When work is finished at night, ask him for details about the day's work, and then, while in his company, let the subject drop. If he is a sportsman, take an interest in what he has to say. Listen as he listens to you when speaking of farming. This will tend to make a bond between employer and employee, and in the long run you will be well repaid. It is supposed that the boss and the labourer are the only two males on the farm. For this reason it is advised that the farmer always employ two men—that is, if he can afford the extra money entailed. It gives the employees company, and they do not get that "fed-up" feeling. The management of labourers only calls for a little thought and tact always give and take, and if the man wants a day off, tell him yes or no without hesitation. He will appreciate it without being told, and will be prepared to forego some of his time for your benefit. Time of getting up and routine are matters for the farmer to decide. . If management is conducted on these lines, it will not be long before the men will be saying, "He is a good boss," with the result that there will never be a shortage of labour. The knowledge that you are a good boss brings as much satisfaction as the knowledge that you are a successful farmer.

The Rabbit Question

[R. ELLIOT, Kulkawirra (Karoonda Conference).]

The immediate reason for this paper may be found in an article which appeared in the *Chronicle* of 15th July, stating that the use of an island in Bass Strait had been refused the Council for Scientific and Industrial Research, to test a virus for the destruction of rabbits, from which they had had very encouraging results. That this question should interest every landholder in the Commonwealth goes without saying, and that any responsible body of men should oppose the extermination of such a pest seems to those who have had any experience of that pest to be unreasonable, but the article mentioned shows clearly that such opposition does exist, and it is up to we land-holders to overcome that opposition if such a result is at all possible. The facts are, that while the rabbit industry brings in a return of £1,000,000 to Australia, the cost of producing that return is somewhere about £30,000,000.

Last year, although rabbits were scarcer than they had been for years, we estimated that they took at least 100 bags of our wheat, and that in spite of a free use of both poison and traps. Those people who have had no experience of rabbits on the land have no idea what a source of worry and loss they are to the landholder. Another direction in which they are proving a nuisance in the light land of the Mallee, is as a contributory cause of drift. In cases where shelter strips and patches of scrub are left, rabbits harbour in them and eat the herbage so bare as to cause drift. This year, where the rabbits are very scarce, grass is growing right up to the edge of the scrub, whereas when the rabbits were plentiful, there would be a bare strip along the edge of the scrub, in places 2 to 3 chains wide. The real extent of the damage done by rabbits is very hard to estimate, but they impose a tax on the landholders of the Commonwealth greater than all the other manifold taxes which they have to carry; and whatever revenue is obtained from them, is at the expense of the landholder. In the Mallee they are retarding the development and prosperity of the country by eating out the desirable grasses, and the trouble is that no matter what is done to reduce the number of the pests, they breed so quickly that the result of one's labour is negatived.

Care of Machinery

[G. H. SUTHERLAND, Coonalpyn (Karoonda Conference).]

Every machine should be put away in the shed as soon as its work is completed. Going through the country, one sees hundreds of pounds worth of machinery out in the weather. There is nothing that wrecks a machine more quickly than being left out in the sun, wind, and rain. When it rains the woodwork expands, hence bolts bite deeper into it. After the wind and sun have dried out the moisture, these bolts will be a little loose, perhaps hardly noticeable to the eye, but with the continued straining while working, the bolt holes soon become larger. Then when you attempt to tighten them they turn. This often means cutting off the bolt and putting a washer behind it; many times this is neglected altogether. A machine that has been put away in the shed, can be gone over with a spanner, and the job completed satisfactorily within a few minutes. It is not necessary to have an elaborate shed: what is wanted is something to keep off the rain. The sun and wind will then not do much harm. The iron roof is favoured to eliminate harbour for sparrows, but a few posts, mallee sticks, and a load or two of straw are a wonderful asset on a farm compared with no shed at all. In these districts of long distances, every farmer should have a small blacksmith's shop. In it he should have an anvil, vice, drill, stock and dies, punches and chisels, two or three pairs on tongs, and a blower. The blower from the small portable forge set up to work with the bottom of an old 200-gallon tank, makes a very good forge, it gives much more space on which to build a fire, and to handle the iron. The material required is half an old tank, about 5ft. of 1½in. piping, a round 1½in. elbow, and an old dray wheel-box to act as a toe-iron.

To Erect.—Raise the tank on a block to a convenient height for working. Fit a piece of piping to each end of the box. Drill the box with several ½in. holes in a circle; punch 2 holes in the tank to take the piping and box. Make sure they are deep enough in the tank to allow building a deep fire. Attach an elbow to the piping, then the blower to the elbow. The blower can be kept in place with a small post and a U clamp. Have a plug for the other end of the piping. This can be moved when necessary to remove dust, &c., which falls into the holes and blocks the wind. Fill the bottom of the tank with stone and mortar. This will make a good, serviceable forge. Two or 3 hammers will be needed, a fair-sized engineer's hammer (a 4-pounder), and a larger one for heavier work. There should also be a fair assortment of bolts, nuts, screws, a few lengths of round mild steel and some old scrap-iron. With this equipment one can do quite a number of jobs. Pull the machine to the shop before starting, and give it a good overhaul. It is time well spent, although it nearly always takes just double the time reckoned on.

When ready for the paddock, make sure there is a box on the implement, and in it put a hammer, cold chisel, punch, and a few bolts of the sizes that are most likely to be wanted. With a harvesting machine, include a tin in which to carry copper rivets, a few gutter bolts, a file, and a pair of pliers. If taking out a cultivator, look at the off-side front wheel before leaving, and see if it is leaning in towards the plough at the top. If so it causes heavier pulling and heavier wear. Set with the lean-in at the bottom, and the implement runs much better. While working the implement, keep your eyes open, and if a little rust is noticed working out from a joint or a bolt-hole, it is pretty certain that the bolts there are loose. Get a spanner and try it. "Do it now" is a good motto for this job. Machines attended to will last years longer with fewer delays from breakages.

Clearing Second-rate Land

[M. F. Ballard, Coomandook (Karoonda Conference).]

Most farmers who have land of an inferior type on their holdings have, in the past, left it alone, because it involved too much time and money to clear it up, and when cleared, it would not grow wheat. Such has been the attitude of many men in the past, but this is being gradually dispelled, and the value of this type of country is being shown in many places by scientific working and the judicious use of super and good grass seeds. Quite a large area of land in the Mallee where the rainfall is 17 inches and over consists of second-rate country. If left in virgin state it becomes a harbour for vermin and is a menace to the rest of the land.

There are, roughly, two kinds of second-rate land, one, a light sandy soil, carrying only stunted mallee, honey suckle, heath, and yaccas, etc., the other, a very stoney, rubbly country with stone outcrops so large and plentiful as to make the use of machinery an impossibility. With the sandy country, it usually happens that the stone is only in isolated patches on the tops of ridges and can be left in patches varying in size from a few square chains to several acres. The land should be rolled and burned in the usual way, but be ready to get an early start with the seeding operations, because when the old sandy land is sown early, seeds germinate and get a certain amount of root hold before the cold weather sets in, and when spring comes the crop comes away very quickly. The cheapest way of working is to broadcast the seed and super, ploughing it in with a disc implement—

not working more than 2in. It is essential that all the ground be turned over, for wherever the plough misses the seed will not grow. The speaker suggested that the old type of disc plough worked with bridle draught would be better than a twin disc.

What to sow is the question and I favour oats, about 1bush. or a little less with a couple of pounds of a good strain of Wimmera Rye Grass per acre as the best and most economical. Oats give a good burn which is so essential to successive clearing operations. Do not put too much grass seed on for a start, it is not warranted as it reseeds freely. Use at least 90lbs. of super. per acre. Go over all of it and cut every stick, even if the crop cannot be stripped, for one stick on the ground is worth two standing up, when it comes to burning time. Everything revolves on the burn remember, and if one obtains a good burn on the first stubble, much will have been done to ensure success. It is advisable to fallow the land the next year and it will not hurt to leave the fallowing until late because the shoots of mallee and undergrowth will get a better check. It does not pay to work this class of sandy land too much for it is apt to drift, and if it is fallowed with a disc across the usual line of wind, it will do a lot to check it.

It depends on circumstances what crop goes in on the fallow, but again oats are best. If the first burn has done its work well, it will pay to put extra grass seed, such as Primrose, in with the Rye Grass and this will result in a fair crop of grass.

If there are paddocks of good grass that are already carrying sheep it is possible to help the grassing process by shifting the sheep from the good land to the new land in early summer when the grass seed is ripe. The sheep will soon carry clover and other grass seeds on to the new land, and if there is super there it is remarkable how soon clovers respond.

After the second stubble has been burned there should not be much rubbish left, and if the land is top-dressed and lightly harrowed there should be a good crop of grass. Do not over-stock the new paddocks, keep plenty of super on them, and after a few years they will carry the burden of their early debt quite easily.

Those patches of stony land will now be showing a fair sprinkling of grass, and it will pay to broadcast super over them, picking out the best patches and the sheep will cut the ground about enough to start the grass. Later, this country will grow good crops, when sheep and super have done their part, and in the long run it will prove successful.

A number of kinds of oats have been tried, and so far Early Kherson is the best. It is quick growing, stools well, and gives a lot of material for the burn.

Can our Districts be made to carry one sheep to 1½ acres

[E. L. Cowled, Borrika (Karoonda Conference).]

Before outlining any system of farming necessary to adopt to enable the land eventually to carry 1 sheep to 1½ acres it is desired to draw attention to the position that farmers must face to-day.

It has become increasingly difficult to grow a good crop of wheat on the older land because of its loss of fertility due to over-cropping, and the loss of surface soil through wind erosion, and unless present day methods are altered, the position will become worse.

Many farmers have been able to put off the day of reckoning by acquiring one or more farms that have been made available by people leaving or being turned off them during the last few years. This cannot continue, neither is it in the best interests of the district or State that holdings should become unduly large. It should be possible for a man to make a comfortable living on an average farm of about 1,200 acres, and when he has finished with it, leave to his heirs a farm equally fertile, if not more so than when he started it.

A Review of Districts.

The district has a fair average rainfall which, although not high, is fairly consistent; in fact, during the past 20 years, there has not been one year when sufficient rain did not fall to ensure the growth of good feed for stock. Further, the district has an abundant water supply, and is handy to good stock markets, thereby ensuring a ready sale for all stock. These factors tend to make stock raising a good proposition for this district.

Disadvantages.

Winter rains are sometimes late and the winters are cold and frosty, retarding the growth of pastures. It has now become necessary to find some method of farming that will enable us to carry the maximum number of stock with the mimimum area of wheat. In doing this it is necessary to keep the following points in mind—first, reduce wind erosion to a minimum; second, ensure a sufficient supply of feed for stock during autumn and winter; third, retain and increase the fertility of the soil; and, fourth, secure sufficient return to enable a comfortable living and make a sufficient profit to keep him in old age.

Rotation.

As a basis for discussion the following rotation as a means of attaining the ends outlined above is suggested. Take as an example a 1,200 acre farm.—First year, fallow 300 acres; second year, sow this fallow with 150 acres wheat, 75 acres oats, 50 acres barley, 25 acres rye—sowing the rye on the poorest soil and land that is most likely to drift; third year, 150 acres wheat, 75 acres oats, 50 acres barley, 25 acres rye, and drill in all the previous years' wheat and oat stubbles with two-thirds rye and one-third oats with 60lbs. super before the rains to provide winter grazing for the sheep; fourth year, 300 acres of fallow with wheat, oats, barley, and rye in the same proportion as for the previous years. Again drill in all the last year's wheat and oat stubbles with rye and oats, and also top-dress with 60lbs. of super the 300 acres that were cropped in the first year. Add Wimmera Rye Grass to all sowings of wheat and oats.

At the end of the 4th year the rotation of the farm will be as follows:—300 acres fallow, 300 acres crop (wheat, oats, barley, rye), 250 acres of stubble will be sown with rye and oats, 300 acres top-dressed pasture of which a good proportion will be Wimmera Rye Grass. Returns from this on the average should be as follows:—150 acres of wheat at 5 bags per acre, 750 bags; 75 acres of oats at 1¼ tons per acre, approximately 100 tons; 50 acres of barley at 6 bags per acre, 300 bags; 25 acres of rye, part of which should be cut green for sheep feed, retaining a sufficient area to harvest to ensure ample seed for sowing the next year's stubble.

Wheat after retaining seed would be sold, the hay stacked, and the carry-over from normal consumption held in reserve for sheep feed during a bad year. The 300 bags of barley after deducting seed should be fed to the sheep during late autumn and early winter each year, giving the sown feed a chance to establish itself before the sheep are turned into it. This would mean a crop of wheat every 8th year and to those who consider that the wheat yield has been estimated at too high a figure it is suggested that having only 150 acres to put in, it could be put down well, at just the right time, and with such a wide rotation, that good yields could be expected. In this rotation reference has been made only to plants that have proved to do well. The writer intends this year to try and establish Lucerne and Evening Primrose. Should these prove successful, it would mean some alteration of the rotation outlined.

With the above rotation and hand feeding, farmers in the Karoonda district district should be able to carry a sheep to 1½ acres, increase the fertility of the soil, reduce wind erosion, and make a comfortable living. In support of the last contention and without going into figures too closely, returns should be approximately as follows:—750 bags of wheat less 50 for seed at 10s. a bag, £350; wool returns from 900 sheep at 10s. per head, £450; returns from 300 lambs at 10s. net, £150—total from wheat, sheep, and lambs, £950.

Super required each year would be as follows:—150 acres wheat, at 1cwt. per acre, 7½ tons; 150 acres oats, barley, and rye, at 93lbs. per acre, 6½ tons; sowing 225 acres stubble with 62lbs. per acre, 6¼ tons; 300 acres top-dressed with 62lbs. per acre, 8½ tons—total 28¾ tons. Cost at £4 a ton, £113.

Deduct cost of super, £113, from gross returns, £950, thus leaving £837 to cover all other costs.

To carry this rotation into practice would require small paddocks of 100 to 150 acres. This rotation is not laid down as a hard and fast rule but rather as an ideal to be aimed at and which may take many years to bring fully into .practice.

Grassing of Pastures with Wimmera Rye Grass in Conjunction with Wheat-Growing

[J. J. FERGUSON, Parilla Well (Lameroo Conference).]

The main natural fodder of this district is Barley grass, and even though it is a valuable fodder at certain periods, it is undoubtedly a grass with many disadvantages. To improve the pastures, what is wanted is a plant that will improve the grazing between wheat crops, because in this district where wheat is the main crop, a grass is wanted that will not take a definite hold of wheat crops.

Experiments were started with Wimmera rye grass 12 years ago on our farm, which is situated north of Pinnaroo. In the early years it was handled with care the opinion being held that eventually it might become injurious to wheat-growing. Later it was found that it could be controlled, and, that its value as pasture fodder excelled all natural grasses.

Wimmera rye grass, although an annual, is a remarkable grass for re-seeding, even though it may be grazed heavily. With rotational wheat-growing and adding a small quantity of seed with the wheat crop prior to being used for pasture, this grass remains dominant over other grasses. Rye grass produces a greater bulk than natural grasses although it may be later in the season in getting firmly established, with good spring rains, it will give green feed as late as November. At all times it is very palatable to stock, even after maturity. Experience has shown that it competes successfully with Barley grass.

This a matter of great importance from a wheat-grower's point of view, for Wimmera rye grass is immune to fungus diseases to which wheat plants are susceptible, namely, Smut, Flag-smut, and Take-all.

The point is often raised that Wimmera rye grass develops into a bad cultivation weed. It is admitted that this is possible, but with careful farming it will not effect the yield to any great extent, and even so, its presence is more of an asset than a liability for it enriches the stubbles and ensures the re-establishment in the pasture the following year. To have Wimmera rye grass as a pasture for an indefinite period, it must be cultivated at least every second year. When this is done and the seed sown with some cereal such as oats, rye, or barley, with superphosphate, good results are obtained. For sowing seed with a wheat crop, approximately 1lb. is a very economical application to establish this plant. Like cereals, Wimmera rye grass responds accordingly with the quantity of superphosphate applied. It is a valuable plant for the prevention of soil erosion of pastures on account of its splendid root system, and eventually it will be used extensively and become a National asset in helping to solve the soil erosion problem.

Papers read at Branch Meetings

Apple Growing.

[H. Schapel (Lobethal).]

Varieties.—For this district Jonathan, Rome Beauty, Red Rome, London Pippin, Statesman, Democrat, Stone Pippin, Delicious and Rokewood are the most profitable lines to grow.

Land for Planting.—A hillside with a good, natural drainage cleared of all stumps, trees and undergrowth, should be ploughed 12 to 15in. deep, cultivated and harrowed down finely. The land is then ready for planting.

Trees should be 18ft. apart in the rows with 20ft. between the rows, to enable one to work the land either way. When planting trees dig a hole about 15in. square and about 9in. deep. Place the tree in the hole and spread out the roots. Fill the hole half full of earth and step down tightly. Put in a good handful of bonedust and fill up the hole with earth. Never use farmyard manure, as that will be more likely to kill the tree than to make it grow. After the trees are planted it is a good idea to crop the land with peas, potatoes or swedes. By doing so the land will be cultivated and manured, which will help the trees.

Pruning.—This should be done in June, July and August. When pruning a young tree see that you obtain a well-shaped tree which can carry a crop of fruit without the limbs breaking. The shape of a tree should be like a wine glass, with the centre hollow an the outside laterals all cut to the same length; this will give an even growth from year to year. Should some of the laterals be stronger in growth than others, cut the weaker ones to the same length as the strong ones, or the tree will soon be out of shape.

When the young trees commence bearing fruit, it is necessary to begin spraying. The first spray should be given in the green-tip stage with Bordeaux mixture (6lbs. bluestone, 4lbs. lime in 40galls. of water); the next in the pinking stage, using 1gall. of lime sulphur in 40galls. of water; the next after the petals have fallen, spraying with arsenate of lead 2-2½lbs. and ½gall. lime sulphur in 60galls. of water. After that, spray about every fortnight until the end of January with 2½lbs. lead and 3 pints lime sulphur in 60galls. of water.

Picking.—The fruit should be picked and not pulled off. Pulling the fruit off will break the spurs and thereby reduce the crop for the following year. When the fruit is picked and put in the case it should be taken to a cool shed, where it should be picked over before being taken to the packing shed.

When fruit picking is finished, clean up the orchard and do not leave apples to rot under the trees. Cleaning up all fruit in the orchard helps to keep the orchard free from pests. Some growers leave cases and cases of apples to rot under the trees. Not once do they think of the harm they are doing to the next season's crop; 95 per cent. of those apples rotting under the trees are infested with codling moth and black spot to breed for the next year.

Sheep as a Sideline.

[E. H. Paech (Summerfield).]

Sheep as a side-line on a farm show the greatest return for the attention required, not only supplying the mutton, lambs, and wool, but are also the best means of packing and keeping the fallow free from weeds. Merino sheep will cut a more valuable fleece of wool, and as a rule are not so troublesome on fences as the British breeds. On no account let your sheep become low in condition; this means less wool and also a weakness in the fleece, which means less value per pound. When feed is becoming scarce, as it usually does at this time of the year, turn to hand-feeding.

Hand-feeding does not take much more feed per sheep, as the sheep can find a little picking in the fields, and one can grow all the feed that is required. About ½lb. per day of good, green, wheaten or oaten hay chaffed—the latter for preference—with a little grain added will fatten or rear a lamb. Usually it is not a long period during which sheep require hand-feeding.

Automatic feeders are the best means of feeding chaff, as they prevent the chaff getting into the wool. Place the feeder in a warm, sheltered spot, so that the chaff will not blow away.

Lambing ewes should be kept in a paddock near the home, and hand-feeding should be commenced two or three weeks before they start lambing. The ewes will quieten down by then, and if any require attention, they will be noticed. A lot of time will be saved by not having to go around the whole paddock, as the sheep will keep close to the feeder much of the time. By doing this, quite a number of lambs and ewes will be saved, which will soon pay for a feeder and for the attention required. With reasonable care, a feeder will last for many years.

Always keep sheep well supplied with a lick. A lick that is giving good results is 1 pint of Kerol to 40lbs. salt. This will keep sheep strong and healthy; and quite a number claim that it will keep sheep free from worms, and also restrain fly strike to a certain extent. Always be on the look-out for worms in the sheep. If a sheep's skin is pale and bloodless, one can be sure that it has worms. Drench sheep periodically, especially during the lean time of the year; do not let them become low in condition. Drench as soon as they appear wormy. Always keep sheep well crutched; this will prevent a lot of fly trouble.

Wheat Diseases: "Take-all" and "Foot-Rot."

[S. G. CHYNOWETH (Boor's Plains).]

"TAKE-ALL" (*Ophiobolus graminis.*)

This disease is to be distinguished from "Foot-Rot." "Take-All" is caused by a fungus which exists in the soil and attacks the roots of the wheat plant. The disease makes its appearance in patches, which are usually round, but which may be large or small, according to the severity of attack. Not infrequently the yield on large areas is seriously diminished—even 50 per cent. When the wheat is checked before it is out in ear, the disease is usually referred to by farmers as "Take-All." Sometimes affected plants give rise to ears which are white and possess no grain; only in rare cases do the ears contain pinched grain. This condition is referred to as "white-heads." If the straws of such plants are examined at the base or butt, they will be found to be discoloured, and usually blackened from the ground level upwards for as much as two inches in bad cases. The roots, especially in later stages of the disease, show an abnormal development of root hairs, giving them a "fuzzy" and woolly appearance. The roots become brittle and break off readily if the plants are pulled up. Sometimes an excessive development of secondary roots is noticed. The butts of the plants at the ground level are, in late stages, usually rotted through, which gives rise to the signs of mal-nutrition in the ears referred to above. When examined miscroscopically, a felt-like mycelium (fungus threads) or plate of a black to brown colour is noticed encrusting the stems and leaf sheaths of the plants at the base. These fungus threads are ramifying in the basal leaf sheaths and in the straw, and result in the early death of many of the cells. In very advanced stages there may be noticed on the blackened straw of the dead plants a development of the fungus spore cases. These shed their spores into the soil. Infection takes place from the soil, the young and growing wheat plant being attacked by the fungus, the threads of which enter the plant near the ground level, establish themselves in the root-system and in the lower portions of the stems, and live parasitically at the expense of the wheat plant. Various grasses are also affected with and can convey the disease—Brome grass, Barley grass and others. The occurrence on oats is rare, though not entirely unknown. Barley is also attacked. Crops that are fed off are often more severely affected with "Take-All" than those which are not fed off.

CONTROL MEASURES.

1. Stubble from a diseased crop should be burnt off. This method of control is not completely satisfactory, as the fungus in the soil and on the base of the plant may escape destruction.

2. *Crop rotations* in which a resistant crop, such as oats, is included help to starve the fungus in the soil. Barley should not immediately follow wheat, nor should wheat

follow barley where the disease has been in evidence. *Rotations* which have been suggested to follow a wheat crop badly attacked by "Take-All" are:—(1) Early and well-prepared fallow. (2) Oats. (3) Early fallow. (4) Wheat. Or modified as follows:—(1) Early fallow. (2) Oats (grazed). (3) Oats (sown on stubble land for reaping.) (4) Fallow. (5) Wheat.

3. Bare fallowing also helps to starve out the fungus. Best results are obtained when the fallows are kept clean of all grasses which are susceptible to attack.

4. Avoid ploughing through "Take-All" patches when the land is in a very dry and dusty state, as this apparently helps to disseminate the fungus more widely. Some authorities consider that late fallowing is worse than not fallowing at all. The reason apparently is that late fallowing only serves to distribute the spores of the fungus which are present on the stubble and on the grasses of stubble land, and does not provide an adequate programme of starving out the fungus. Early fallowing, however, is regarded as particularly beneficial.

5. Sow varieties at correct periods as determined by their seasonal characteristics. Early maturing varieties should be sown late. Feeding off is undesirable and should be avoided whenever possible.

"FOOT-ROT."

This disease is generally first observed in an affected crop shortly after the flowering period. Isolated heads throughout the crop appear to be ripening off prematurely, and either fail to set grain or produce grain, which finally becomes shrivelled and practically worthless. Although most frequently observed in scattered plants, the disease may also occur in definite areas. In this it resembles somewhat one of the characters of "Take-All." Occasionally, also, plants are observed to be affected with both "Take-All" and "Foot-Rot."

"Foot-Rot" is caused by a parasitic fungus which attacks the plant just below the surface of the ground. The fungus is most frequently a form known as *Helminthosporium sativum,* but during the past few years other fungus spores have also been found in association with the condition, *e.g.*, *Wojnowicia graminis.* Plants affected with "Foot-Rot" may sometimes be killed in the seedling stages, and the disease is a common cause of poor stands in some seasons. In more mature plants the stooling is generally very poor. Sometimes only a few straws produce heads and the others remain undeveloped, having been stunted by the fungus parasite. The heads are usually checked in their development, and frequently the lower flowers are not formed. The root system is also affected, and, as in "Take-All," there is an abnormal development of root hairs, which gives the affected roots a "fuzzy" appearance. When diseased plants are pulled up the roots break easily. A close examination of such plants at and below the ground level shows a most characteristic brownish marking of the leaf sheaths and straw. Sometimes the marking is in the form of brownish tobacco-coloured streaks or spots, and sometimes there is a uniform discolouration of both sheath and straw. When the plant is dead, the colour at the base is ashen-grey, and the destruction of tissue is observed to extend into the straw. "Take-All" plants, on the other hand, generally show a charred or blackened appearance at the base of the straw. However, it is not always easy to differentiate between these conditions in the field, especially since one of the "Foot-Rot" organisms (*Wojinowicia*) results in a blackened discolouration at the base, very like that caused by the "Take-All" fungus, although generally it is not so extensive. Infection takes place from the soil. Stubble and refuse from a diseased crop harbour the disease and enable it to live over in the soil from year to year. The disease is not carried over in the seed as a general rule. Although the disease may be sometimes introduced by means of the seed, it does not necessarily follow that diseased grain will be produced by a crop affected with "Foot-Rot." However, in some seasons the *Helminthosporium* fungus may also attack the grain and result in a brownish-black discolouration at the germ end. This condition is known as "Black point," and although other harmless fungi may also cause this condition, it is not desirable that such grain should be used for seed, since it may result in the introduction of the "Foot-Rot" fungus into clean land. It has been observed that "feeding off" may increase the amount of damage caused by "Foot-

Rot" and "Take-All." The check which the crop receives under these circumstances apparently enables the causal fungus parasites to bring about more serious injury than would otherwise be the case. The "Foot-Rot" fungi may attack barley, and have also been found on native grasses, such as barley grass, spear grass. Oats are not affected.

CONTROL MEASURES.

The following control measures are known to be of value in minimising losses from the disease:—

1. Burning the stubble will kill much of the fungus material which is present on the surface of the soil.

2. Bare fallowing will help to starve the fungus in the soil. The best results are obtained when the susceptible grasses, *i.e.*, barley and spear grass, are kept down.

3. A crop rotation system which introduces a non-susceptible crop, such as oats, will also help to starve the fungus.

4. Early preparation of the seed bed results in hastening the decay of old stubble on which the fungus can live, and also assists germination and destruction of the spores before the grain is sown.

5. Only sound and plump graded seed should be used. A sample with pinched seed or "black pointed" seed should be rejected.

6. When wheat is sown primarily for production of grain, all possible provision should be made to avoid the necessity for feeding off.

Tray Drying Lexias.

[MR. F. LEWIS, Ramco.]

A grower who has a mixed block of deciduous trees and some Gordos will often find it profitable to dry at least part of his Gordo crop on trays. In most seasons he finds he has not enough rack room, and his trays are lying idle when they could be put to good use.

I have always dried about half my Gordos on trays, and these are packed and marked separately to the rack-dried fruit and sent to the London market, where they sell readily at a premium of £2 10s. to £5 a ton on the same fruit rack dried and sold on the same date

One of the advantages of trays is the saving of time in drying, which is usually about half. For instance, this year picking was finished on 26th March. Part of this day's pick was put on a covered rack and the balance on trays. The tray-dried fruit was packed and despatched to London on 23rd April and that from the rack was picked up from the hessians on 6th May.

This season was the worst ever experienced here for vinegar fly. Some of the rack fruit necessitated a lot of expensive belt picking, in addition to a great loss in weight and a large proportion of distillery fruit. The fruit dried on trays was not affected in the same way. Any berries badly infested on the vine shrivelled up in the sun-drying and were easily graded out.

The proportion of large-graded fruit in the tray dried is greater, as it naturally dries round and flat; whereas on the rack it is somewhat elongated, and therefore more goes through the riddles.

The great drawback to tray drying is the handling cost, but experience has shown that apart from turning—which is a back-aching job—there is very little difference; and if for lack of room the fruit has to be taken off the racks before it is actually dry, the cost of handling may easily become greater than tray drying. Of course, the trays should be stacked as a protection from rain, as only a few points, especially before turning, will definitely darken the fruit. However, although the dark fruit does not look so attractive, it seems to sell just as well in London.

Discussion.—In reply to questions Mr. Lewis said turning of trays was no trouble. One man could do this. A piece of hoop-iron 2in. wide by about 8in. long and bent U-shaped with the ends turned out would grip the trays and the work was easy. Wet fruit on trays was not detrimental as they worked. They brought down 24 buckets on trolley and dipped 12 each side and when next load came down spread. Tray fruit did not sugar. Fruit did not stick if trays were clean. A 3ft. x 2ft. tray held a bucket of fruit. Spreading was slower than on racks; that was where the labour cost came in. He did not recommend trays for sultanas. He used pure caustic dip for lexias on trays. Other dips could be used, but oil might cause dust to stick. Tray-dried fruit tasted different from rack-dried and did not sugar. Fruit was not affected by vinegar fly because it was in the sun and bees were not so troublesome. Colour was much darker, but taste seemed to tell, and sales were good.

Clearing Ti-Tree.

[Eric L. Bank (Robe).]

Grubbing by hand, which was at first tried, proved to be the best method, but the cost of from £6 to £10 per acre made this method prohibitive in large areas.

The next method was cutting strips about 1½ chains wide at varying distances through the Ti-Tree. This was a partial success as far as cutting was concerned, but a large enough area could not be cut. When this dried and was burnt, the uncut was also scorched and blackened and made very bad to handle; and it grew up very quickly. An attempt was then made by pulling out all trees and stumps with a wire rope. This entailed two extra men to hook the ropes on to the trees and stumps and also to stack them when pulled out. It made the surface very uneven with the large holes which were left when the roots were pulled up. This proved effective, but for the slowness and cost of the work.

Finally, the scheme now in operation was put in action with success up to the present; but time will tell whether it will be lasting.

Implements necessary for this class of work have to be procured. The soil on this class of land being in many places too soft to carry horses, it will be necessary to purchase a crawler type of tractor, sufficiently powerful to equal the pull of 14 horses, to drag the roller. Some parts of this land are so soft that they will scarcely carry the weight of a man. The tractor, of course, has only a pressure on the surface of 4 pounds weight to the square inch. The tractor is equipped with a bumper bar for pushing down large trees, a radiator protection plate to protect the radiator from sticks or limbs which may come in contact with the front of the machine, and a steel plate to cover the sump of the tractor, so that it will not be damaged in hitting stumps.

After making the tractor safe from injury, it will be necessary to have a roller to drag, so that the scrub may be rolled down to make a track for the tractor to crawl on and to support it where the ground is so soft. The tractor without the roller or a load would travel over the greater part of the land, and in the first instance it is used by itself in marking out the first piece for rolling. The best type of roller is an old boiler, 4 to 4½ft. in diameter. This roller should be built with a frame 4 to 5ft. out at front and back. The frame should be about 3 to 3½ft. from the ground. The pole in the roller should be about 18ft. long, without a wheel in front on the end of the pole, as is usually adopted. This will be thought strange, but in the soft places a wheel will only bury itself and cause trouble, especially on the turning points. The roller without the wheel is balanced so that with the pull of the tractor the pole will rise sufficiently high to allow the end of the pole to clear any stumps or obstacle which it may come in contact with.

The roller is pulled by a wire cable adjusted so that it pulls on one side of the tractor and also off one side of itself, with enough cable length over the end of the pole to allow the tractor to swing and turn easily. Sometimes a further extention of a frame is used over the frame of the roller for the purpose of pushing over the larger trees before the roller comes in contact. We have not adopted this method, but it would be an improvement in the high Ti-Tree. A roller of a weight of 30 to 35cwt., with a width of 7½ to 8½ft. may be pulled in the worst type of this country with ease. This helps, as there is no time lost in getting stopped with too heavy a load, and it reduces the cost of extra labour, in getting bogged. Of course, it is necessary to have a man following the roller for emergency purposes and for the driver's assistance.

The driver must have a certain amount of confidence in his tractor. At different times he gets into very nasty places, and the tractor also gets into queer positions. Sometimes the radiator of the tractor is 4 or 5ft. in the air, sometimes the reverse —the radiator right on the ground and the back of the tractor 4 or 5ft. in the air. Sometimes it is on such a slope sideways that the driver has a very hard job to stay in the seat of his machine. After these experiences the driver becomes used to his machine and knows that when he is in trouble if he lets his machine go its own track it will right itself and will not topple over.

Among the necessities for the clearing of Ti-Tree on a large scale is a full kit of tools as well as a good jack to lift up to 5 tons. (The tractor, of course, weighs over 2½ tons) and capable of lifting the tractor 1½ to 2ft. at a lift, and also handy enough in operation for one man to manipulate with ease. Of course, the extra man is occupied in blocking up the machine when jacked up, and also in having wood and rails ready for such a purpose. There is no tractor that cannot be bogged, and it is often necessary to jack a bogged machine high enough to allow 3 or 4 rails to be thrown under the tracks so that the machine may crawl out on to good ground. An extra length of cable of 10 or 12 feet is an advantage for coupling on to the roller, in order to get on the opposite side of a very bad patch. In some places in Ti-Tree there are clear patches which are very soft.

The period for commencing operations should be as early after the winter as possible, to allow the rolled-down Ti-Tree a greater part of the summer to dry; and also to allow the Ti-Tree to shoot up again to a height of 1½ to 2ft. Amongst the old timber, burning, when at this stage, is a double check on the growth of the stumps, and with a very hot fire on a suitable day —preferably a hot north wind—70 per cent. will be killed. If the following winter is severe enough to cover the roots left before they shoot above the water, this will cause the weak growths to die off.

The larger Ti-Tree—say 20 to 25ft. in height—is easiest to deal with from a killing point of view. A good deal of this is rolled out by the roots, and roots as well as shoots are exposed to the fire. After a good burn the plough is going to play a large part in cleaning up. Although this part of the work is only in its infancy at the present, it appears that the land exposed to the sun and air will harden enough to allow it to be ploughed 10 to 12 months after burning off.

Benefits of Clearing Ti-Tree Land.

The home of vermin, such as rabbits, foxes, and wombats, is destroyed, and this alone would compensate for the expense of clearing.

This country in its natural state is useless and valueless. Cleared and sown down it may be made the most prolific and valuable land in the district.

The best fodder grasses, such as strawberry clover, perennial rye grass, &c., will thrive on this land. Potatoes and root crops and vegetables will grow at their best.

Summer Fodder.

[W. L. Laslett & G. Thompson (Allandale East).]

The first thing to consider is the careful selection of a piece of rich ground. For instance, the feed would need to be grown somewhere where it would be handy for hand-feeding, especially in the case of Chou-moellier and maize.

Type of Soil.—It is necessary to have a soil that will hold the moisture, and supply the required nutriment. Select a good, clean piece of ground. Weeds, such as fox-weed, couch grass, Kentucky blue, blue root, and fat hen, help to take the moisture from the plants or seeds as the case may be, and moisture is one of the most important factors in growing summer feed. One of the most suitable is a soil with a loamy top and a clay sub-soil. In a dry year plants do quite well on soils with a limestone bottom, which has a tendency to hold the moisture.

Fallowing and Working of Land.—It is necessary to fallow the ground about six weeks or so before planting the seed. Fallowing about the middle of August would allow the fallow to break down enough before planting in the latter part of September or early part of October. It is a good idea to let the ground lie in its rough state for a fortnight or so. This also makes it easier to work down with the harrows. In the stiffer class of ground the disc cultivator is a great implement for cutting the ground. In most cases it is a good plan to roll the ground. In the case of stiff soils it helps to break down the lumps, and in looser soil it helps to firm the land.

Manure.—It is a good idea to spread manure on top of the fallow. In this way super. and other manures are ploughed in when ploughing for planting. This has a tendency to lead the roots downwards, and the further the roots go down the more moisture they will get. This applies to Chou-moellier and maize. With other plants the super. would go through the drill. The plot that is used for the summer fodder is the place to apply the stable manure, which will show a much better return than if used on the paddock for cropping.

Chou Moellier.

Selection of Seeds and Various Types of Seeds.—Of the seeds used for summer feeds perhaps Chou-moellier is the most popular, because of the fact that it can be planted to pluck and can be drilled in for feeding off. When drilled in, there is not the labour of keeping the rows clean as there is when it is planted in rows. Where it is drilled in use 1lb. to 1½lbs. of seed with about 85lbs. of super. to the acre. When planting in rows have the ground solid. Keep the rows straight to allow it to be scarified both ways.

Maize.—The Hickory King and Ninety Day varieties are most suited for this district. When planting keep them a fair distance apart to allow them to be kept clean with the scarifier. While the ground is still damp and easily worked the quickest way is to plant the maize behind the plough, but when the ground is too hard, the scarifier with the two widest tines left on makes sufficient drills in which to plant the maize.

Mangolds.—There are three types of mangolds which are well suited for this district, the Half-Sugar, the Long Red, and the Globe. Of these varieties the Half-Sugar seems to be the favourite, because of sweetness. To grow mangolds successfully the ground must be kept exceptionally clean and free from weeds.

Turnips.—Of the turnip varieties the Purple Top and the Swede seem to be the most popular, especially if these are mixed, about ¾ to 1lb. of seed to the acre—half Purple Top and half Swede. The Swedes are useful for saving until the late summer or early autumn, when grass is scarce. If put in a heap with a layer of soil, or a few inches of straw on them, Swedes will keep for several months. It is not necessary to have particularly heavy ground for turnips; they seem to do quite well on lighter soils. Turnips can be sown on new soil, such as ti-tree or swamp land, for the first crop. Should the ground be at all salty, the growing of turnips is advantageous, as they will grow where other plants would die off. Turnips are perhaps the heaviest yielders of all summer fodders. In the Port MacDonnell district this year a crop was claimed to have yielded 20 tons to the acre.

Millet is quite a good summer feed, but is rather unreliable. It can stand the dry weather much better than other plants. Millet is an excellent milk producer and responds exceptionally well after being fed off.

Rape is quite a good dual-purpose feed, for both the dairy herd and the sheep. One thing against rape for the dairy herd is that it will taint the milk if the cows are left on it all day. The only way is to take the cows off the paddock of rape three or four hours before milking. Rape is an excellent feed for topping off fat lambs for market. Old broken-mouthed ewes (if their teeth are pulled out) put on a good paddock of rape will fatten up surprisingly quickly. Kale is grown similarly to rape, but perhaps in larger areas, as it is used more especially for sheep.

Care of the Crop.—Perhaps the main thing in caring for the crop is to keep it free from weeds, and prevent the soil from becoming hard and caked. The best method of doing this is by constantly using the scarifier.

Feeding.—The best time for feeding is directly after the morning's milking; that is, where hand-feeding is practised. When turning cows on fodder, it is advisable to bring the herd out a few hours before the night's milking. Some claim that to feed cows on hay after bringing them out of the fodder paddock helps to lessen the taint of the milk. Where feeding off is practised in, say, a paddock of 10 to 12 acres, it is advisable to sub-divide it into two or three paddocks with temporary fences.

DISCUSSION.

Mr. Griffin had found it better to use ½lb. of purple top and ¼lb. of Swede turnip seed to the acre rather than the half and half quantities mentioned by the writers. The purple top came in earlier, and by the time these were finished the Swedes would be ready to feed out.

Mr. W. F. Thompson greatly favoured putting in the Chou-moellier seed with the drill and feeding it off. This saved a great deal of labour, and the feed was eaten just as readily by the stock.

Mr. T. H. Earl agreed that it was advantageous to use the roller. If a roller was not available the next best plan was to turn the harrows over and drag it over the surface. This had the effect of pulverizing and levelling the soil.

Mr. Griffin thought that if feed was grown for sheep only, it would pay to grow Thousand-headed kale. On account of its producing a strong taint he did not favour its use for dairy cattle.

Fences, Panels and Gates.

[N. W. BITTNER (South Kilkerran).]

When a farmer or grazier intends erecting a line of fence, he should make sure that he procures posts of lasting qualities, such as gum, concrete, or good white mallee for strainers, and either railway iron, concrete or sawn gum for middle posts. Railway iron also makes an excellent middle strainer. This, of course, cannot always be procured in large enough quantities or at a reasonable price. When a landholder contemplates renewing the fences on his property, he should select a gauge for the spacing of his wires and keep it uniform throughout his property; then he will not be troubled with the different gauge iron droppers being mixed up, with the possible result of two or three different gauge droppers in a strain. A suitable spacing is 10in. between 1st and 2nd barb, 6½in. between 2nd barb and 1st plain wire, and then three spacings of 5½in., which leaves seven inches between bottom wire and the ground on a 3ft. 4in. fence, making a good 6-wired fence. Before erecting a fence, one should first consider the most convenient place for a panel and gate. I say panel and gate, as I thing the two are necessary side by side. A panel is a necessity for saving time in moving harrows and other large implements from one paddock to another. As a panel should always be kept closed to avoid damage by stock, a gate should also be erected. It is often found convenient to have the gates open to allow stock to go from one paddock to another as they wish, and besides, gates are much more convenient when going around your land with horses, car, &c. In starting the fence, the first and of course the most important thing is the strainer. Select a good gum or white mallee strainer about 12in. to 14in. in diameter, and about 7 feet long, and when the hole is dug, place the post in position and ram it thoroughly. Set the strainer leaning a little away from the direction of the strain, as strainer posts will take up a little against the strut when straining, no matter how well the strut might be fitted. The strut is the most important thing as far as keeping the fence tight is concerned, and great care should be taken in its selection and fitting. In selecting struts, be sure to take something that will last. Many a good fence is going to ruin because of inferior struts, which after being in a few years rot or break, and allow the strainer and then the whole fence to give. I would, therefore, suggest using odd lengths of railway iron; or if one had any angle iron from old implements, it might be quite suitable for the job. Failing either of these, use 1½in. piping. The struts should not be any shorter than 7ft. or 8ft., and should be put against a good solid stone or concrete block let into the ground. They should be fitted against the post at about 3in. to 4in. from the top wire. A good way for fixing against the post is by drilling a hole and driving in a ⅝in. peg.

A fence should be erected in about 10 chain strains or whatever works in best with the length of fence line to be erected, preferably making the strains a chain or two shorter rather than longer. The middle posts should be placed at spacings of 60 feet with an iron dropper driven in alongside and twitched to the post at the two barbs. This does away with the tiring and time-taking job of boring holes in the post and stapling the wires. Five iron droppers should be put between each post at spacings of 10 feet. When renewing an old fence line, it is not always necessary to use all new wire. It will be found that a lot of the old wire, if it is not too rotten to splice and strain, will, when once put in, last for many years, thus making it possible to have a good fence at quite a reduced cost.

Notice should be taken of the rise and fall of the ground, and the posts set in a little higher or lower accordingly. In cases where the hollows are too great, take out a scoop before erecting the fence, and scoop in some earth from the higher places. This looks much better and is much better for the fence than to have an unsightly log suspended from the bottom wire to stop sheep from crawling under.

PANELS.

The best means of erecting a suitable panel wide enough to pass through with the widest implement seems to be a very vexing question. There always seems to be some trouble to find a type of panel that will do up nice and tightly and will not sag, and at the same time be convenient to handle for opening and closing. One type of panel is always done up tightly and looks very neat, but it seems to have its disadvantages. It is the double type of panel made of 8 wire Cyclone with two barbs on top, fastening at the centre to a removable post and hitch—and this is where the disadvantage seems to be. The hitching post is fitted in the centre by being screwed into a piece of tubing fixed in a block of concrete. When the harrows are taken through it necessitates the removal of this post, and there would be a tendency for this tubing to fill with earth. It would also be necessary to have the tarpot with you whenever going through, so as to tar the thread to prevent it from rusting. Also it would be rather expensive for a type of panel which still has such disadvantages. Another type of double panel does up at centre with five of the usual type panel hitches. While this may be possibly a little easier to fasten than the single panel, it still has the disadvantage of sagging badly at the centre. The most desirable type of panel out of a bad lot at the present is the single panel made of 8 wire Cyclone with a barb on top and stiffeners twitched on at about 10ft. spacings and fastened with a panel hitch at both top and bottom. It will be found that this type, although not the easiest, will not be too bad to fasten, and will also stand up reasonably straight.

A 14 foot iron gate would make it possible to take through a 12-horse tandem team, besides smaller implements, such as a 20-hoe combine and ploughs, &c.; thus making it necessary to open the panels only for harrows and big harvesting machines, or in the case of power farming, when two or more implements are hauled behind the tractor.

Subterranean Clover.

[J. Legoe (Kingston).]

Subterranean clover is an annual which, on account of its characteristic of re-seeding, by forcing the lower shoots into the ground, is quite permanent when once established. From this habit the clover probably derives its name.

It might be of interest to mention that Mr. A. W. Howard, of Mount Barker, is given the credit of discovering, proving, and giving publicity to this really important fodder. Mr. Howard discovered this clover some 40 years ago.

Subterranean clover will germinate with the first good autumn rains and die down about the end of November or early December. It is a leguminous plant and, like peas, puts a lot of nitrogen into the soil. In its green state it provides a succulent fodder of which all stock are fond, and if allowed to die down before stocking it is still readily eaten. This clover requires a temperate climate with a rainfall of over 20 inches and a long growing period of 8-9 months between the first autumn rains and the hot, dry weather to produce the best results.

Type of Soils.—Subterranean clover appears to do well in most soils with a good clay subsoil, and if given plenty of phosphoric acid in the form of superphosphate, it will grow well in sandy and the so-called "sour" soils.

Seeding.—The best time to sow clover seed in this district is in the latter part of April and May. In most years, if left later, wet and cold weather may be experienced, and this would not give the clover time to get a good hold before the winter sets in. A lot of clover sown in June, last year, did not make the growth which the May sown clover did. If sown early the clover has a good chance of establishing itself before the seed is formed, and as the plant is an annual it is obvious that a good deposit of seed is essential in the first season to ensure the continued spread of the plant. In the winter the clover makes good root growth, but very little stem and leaf growth occurs until the warmer weather in the spring. It is advisable not to stock clover or only very lightly the first year, to give it a good chance of establishing itself. One often hears the remark "Yes, the clover did well the first year, but died out," and the fault generally is not with the plant but with too heavy stocking before the plant has time to develop its seed supply.

Rate of Seeding.—Three to 4lbs. of clover should be ample if sown with other grasses or a cereal as a cover crop. Last year we sowed 3lbs. subterranean and 2lbs. Wimmera rye grass to the acre with a bag of superphosphate and the germination was good.

Method of Seeding.—There are three ways subterranean clover can be sown. (1) Broadcasting. (2) Drilling straight on to grass land with a combine. (3) Ploughing and putting in with a cover crop.

Broadcasting the seed—unless on fallow land—is not a paying proposition. A lot more seed would be required to get any result, as so much would lie dormant on the top of the ground. We put down about 800 acres last year with the combine by running it straight over the grass land, and had very good results. This method is quite good if one wants to sow a lot of land in one year and to do it a cheap way. It cost approximately 15s. an acre to sow land in this way last year. This cost includes hire of tractor, seed, superphosphate, cartage, and breakages. Ploughing the land in, say August or September, and allowing it to lie as fallow until the following April, is undoubtedly the best method, but it is also the most expensive. Land broken up in the winter for fallow should be worked several times before seeding to break it down to a fine tilth. This will also enable one to get a firm, shallow seed bed.

When putting clover on fallow land it is advisable to sow it with a cover crop, such as oats. This crop will give it the necessary shelter it requires the first year to establish itself. Always sow the seed at as shallow a depth as possible. The method used to ensure this is by taking the drill hoses out of the buckets to allow the seed to fall on top of the ground; and the combine hoes and a set of harrows following on behind will enable all the seed to be covered.

We broke up some virgin land in August last year, cultivated it with a sundercut in January, cultivated it again in April with the combine, and seeded it in May with the combine, dragging a set of light harrows behind the combine. On this piece of land, which was sown with 2 bushels oats, 3lbs. clover, 2lbs. Wimmera rye grass, and bag of superphosphate, a good germination can be seen. Subterranean clover will stand heavier grazing than will most other annual crops, but care should be taken not to feed off too closely during the winter, because more growth left on the plants at this time of the year will mean greater root development and more rapid and bulkier growth in the spring. When clover is sown, the paddocks should be subdivided and fed off rapidly and not too closely. Then the stock should be removed to the next paddock, until sufficient growth is made for it to be stocked again.

Annual applications of superphosphates are essential for the best results, and the heavier these are the better the growth will be. When putting down new pastures we apply superphosphate at the rate of 1 bag to the acre, and top-dressed clover was sown last year with 140lbs. superphosphate to the acre.

Summary.—Subterranean clover:—

1. Requires a rainfall of over 20 inches.
2. The seed must be sown in time to germinate well before the cold weather sets in.
3. Sow the seed as shallow as possible with a good application of superphosphate.
4. It returns a lot of nitrogen to the soil, thus increasing the organic matter content of the soil.
5. It should be sown in small fields, and a method of rotational grazing used to obtain the best results.
6. When top-dressing established clover do so as early as possible—March or April —so as to catch the first autumn rains.

Incubation.

[W. J. Brook (Hartley).]

The best time to hatch chickens that are intended for egg production is in the months of August and September. October and November chicks are usually weedy and more subject to disease than the early hatch and seldom produce as well.

On farms where a large number of chicks are required to replace the aged and inferior sorts of hens and the incubator room is limited, it may pay just as well to put one batch through in July, rather than hatch in October. The site to be chosen for incubating the chicks should be in a room without draughts, but with plenty of ventilation particularly, because nothing will destroy the embryo chick more quickly than kerosene fumes. When trimming the lamps, be careful to turn the eggs on the tray first, so that the hands are free of kerosene when handling the trays. The success of incubating depends largely on this factor. Another thing that will cause failures in hatches is the incubator running unevenly. To obtain the best results in rearing chicks it is necessary to have some knowledge of their food requirements. The average weight of a light breed of chick when born is 1½ozs. If properly fed and managed, these breeds will double that weight in a fortnight. At a month old they should be 6ozs., and at 3 months old 2lbs. 7ozs. Owing to this rapid growth, the chick will react very quickly to any changes of feed. People have different methods of feeding, but whatever your method is, do not change it quickly if a change is necessary. A chick's food must contain vitamins A, B, and D. Vitamin A is best supplied in the form of cut-up green grass, clover, lettuce, cabbage-leaves, lucerne, &c. Vitamin B is present in the outer covering of grain, and vitamin D is brought about by the sun shining on the chick's body or on its foods. Thus plenty of sunshine is required.

Lessons Learnt from 1936.

[I. S. Anwyl (Inman Valley).]

The writer has been mostly engaged in knocking down virgin scrub and establishing pasture on land of varying soil types, ranging from poor to very poor.

The major portion of the land dealt with carried stringy bark scrub. The method employed was to knock down the scrub with a roller, burn as soon as the opportunity offered, trim the worst of the snags and cultivate as lightly as possible with a sundercut and 6ft. of harrows on the one draught.

In 1936 clover was sown with oats as a cover crop, starting seeding after the first early rain, which fell in late March. Oats and superphosphate were broadcast separately on the fallow, and ploughed in with the sundercut. The clover was then broadcast by hand, about half being covered by brush harrows, and the other just left on the surface. The germination of the clover was satisfactory—noticeably better where the seed was brushed in.

Unfortunately, last year's opening rain was followed by fairly hot weather and drying winds. Much of the clover burned off after forming the first trifoliate leaves, particularly on the stringy bark land, where the sand is coarser and the clay subsoil generally deeper below the surface. Further, the spring rains did not fall until late in the year, and few of the plants seeded very heavily.

The nett result, as evidenced by this year's germination of the clover sown last year, while not discouraging, was nothing startling. Much of the failure can be attributed to weather conditions on comparing the results obtained from land sown similarly this year, with such a splendid opening of the season.

Some of the lessons learned were:—

That scrub rolled when the land is saturated leaves fewer snags to deal with.

Two cultivations with the disc on yacca pays, on account of the number of yaccas destroyed and stumps pulled.

That it is necessary for best results to cover clover and grass seeds on a loosened surface; and a heavy chain on about a 10ft. spreader bar was found very effective for this.

Possibly one of the earlier strains of clover, such as West Australian Dwalganup, would give better results on the poorer sands than the mid-season Mount Barker. The latter takes about 140 days from germination to the flowering stage, as against 104 for the early strain. This year about 30 acres have been sown down with 6lbs. early subterranean clover and 4lbs. Wimmera rye grass, with 1 bag superphosphate. Much of this is on bracken fern land and looks very healthy so far.

With regard to bracken fern, one can learn a few lessons. Some small patches have been completely eradicated within twelve months by cutting the fern and planting Kikuyu grass fairly thickly amongst it. To promote the quick growth of the grass, it should be planted in wet weather and top-dressed with farmyard manure, leaving the flag exposed. Sulphate of ammonia would be effective, but it has not been tried. Kikuyu grass does not show any marked response to superphosphate. To deal with fern in large areas, a roller, constructed of angle irons spaced 4in. apart on the outer circumference, was found to be most effective. It is very cheap to work. Mine is drawn by a light horse, and the boy stands on the platform and drives it like the Roman chariot.

The best time of the year to deal with small patches of fern is from January to December. Small areas have been cut, and even pulled each time the fronds showed through, and eventually the rhizome has come through the surface and formed small hoops above the ground. One can then pull it out by the yard.

To wipe out acres in this manner would be impracticable. The method now in use is to roll whenever necessary after the pasture grasses have seeded, and cultivate with the sundercut in early autumn.

The rhizomes will come nearer the surface every time the fronds are checked with the roller, and the disc will kill a lot of them. It was found useless to cultivate a strong growth of bracken fern without first weakening it, as the fern seemed to thrive afterwards. Bracken fern ash contains a very high percentage of alkali, and nothing seems to do as well as the fern after a running fire through standing, or even rolled, fern.

Sheep on a New Block.

[M. B. DUNSTAN (Brimpton Lake).]

The three main factors are feed, fences, and water. Fences must be erected on all land that is intended for grazing with sheep.

The fences should be of a sheep-proof nature, the paddocks being cut into 100 acres or thereabouts if possible. The smaller the paddock the more feed available from the same quantity of land.

Feed is easily over-estimated by the novice with sheep; new land will not produce as much feed as old land. A paddock of oats and Wimmera rye-grass put in during the end of March would greatly help the feed problem at the beginning of winter and at lambing time. Wimmera rye-grass can be sown with a wheat crop the previous year (about ½lb. to 1lb. per acre) and will give good feed the following year with oats.

It is wise to have a few bags of feed oats saved for the stinkwort period. Everyone starting with sheep should lay in a supply —say, 100 bags—of good cocky-chaff as a reserve. This can be obtained for very little expense, and is of great value.

Water is an item that cannot be underestimated. During summer it is more important than feed, and the sheep should not have to travel any farther than necessary. Always allow a few trees to grow around the well or dam for shade.

The best way to learn is by experience, and for this reason start off with old ewes and not a large number. There are bound to be losses at first, which will not occur when more knowledge is obtained. With old ewes off shears, after they are kept a few months, a dead sheep is not a loss, as the skin is of more value than the cost of the sheep.

The main trouble among practically all sheep men in the district is Stinkwort. The only cure for this is vaccination, which will greatly assist the farmer and certainly be a big saving. Sheep can be done for about 1d. per head.

If an oat or rye paddock is provided this would be a first-class preventive. It appears that the Stinkwort does not affect the sheep until the flowering stage is reached and is worst when it is going off.

Sheep from some land will definitely tackle Stinkwort more than others. The sheep that has been brought up among Stinkwort does not eat it as readily as the stranger to Stinkwort. That statement is made with reference to old ewes only as experience.

Sheep should be attended to regularly during the summer for flies, and any sheep that look doubtful should be cleaned up. Watering provides a good chance to look over the sheep, and one can soon pick a sheep that is affected with the flies.

Fencing in Districts of Light Sandy Soils.

[C. GUM (Karte).]

Fencing in districts of light sandy soils seems to be quite a different proposition from fencing in localities where the soil is not liable to drift.

With the experience of older districts adjacent to Peebinga Hundred it seems we will have to alter our ideas of putting up the substantial old-style fence of a good gum post every half chain with two iron posts between. In some parts where the soil has drifted, people have had to dig their fences out and make larger paddocks. This entails a lot of work when the solid posts are put in. One of the most suitable fences for the district is the one made principally of iron posts, with good wooden strainers every 8 chains. These could be either pine or gum.

The first essentials are the strainers. It is useless to try and strain wires properly unless the strainers are strong and well put in and the end posts are strutted. With good strainer posts the middle posts do not need a strut as the strain eventually is both ways. The iron posts can be driven in when the barb has been strained. It is then easier to get them straight. They should be put in every four yards.

With this type of fence it is possible to raise or lower it, if it becomes drifted up. For this reason do not put in any wooden posts with the wires run through them, but where there is a limited supply of handy mallee or scrub pine, put the post in alongside as a dummy and tie the fence to it. They are easily replaced when they rot.

On some farms there happens to be enough scrub pine suitable to fence the property. In these cases, of course, it may be cheaper to fence with all pine for some years and save purchasing iron posts.

A good sheep-proof fence can be put up with 1 barb and 4 plain wires, but if one is prepared for a little extra cost, use 5 plain wires, as they can then be placed closer together.

Fencing.

[B. Hudson (Pinkawillinie).]

Once the scrub farm has been cleared the most necessary improvement (excepting, perhaps, water conservation) is to fence the holding. Until permanent fences are erected it is impossible to carry stock beneficially and impossible to work the land to its best advantage. It is advisable to fence the holding into paddocks of from 100 to 150 acres. It is then possible to get the best use of the feed, and small paddocks under fallow are not so likely to drift as large tracts of fallow land.

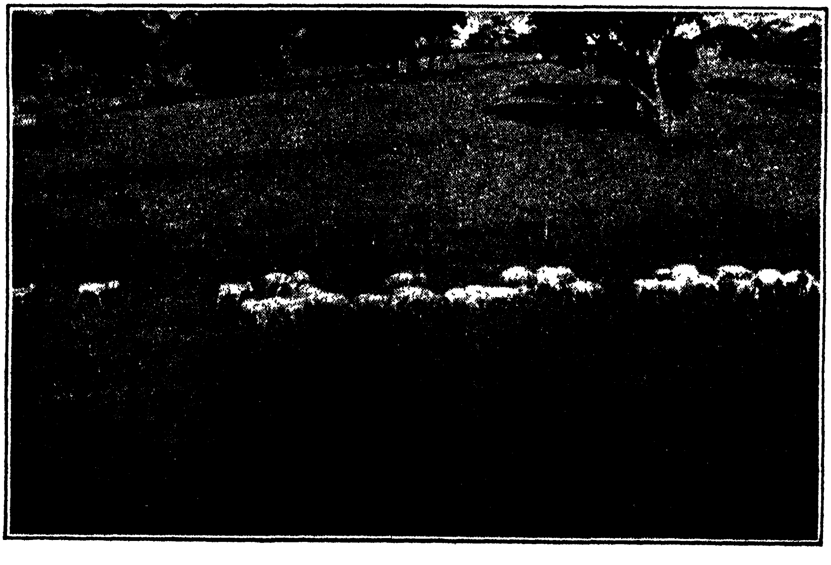
Rabbit Proofing.—Such fences are not required locally, if attention is paid to these pests, and moreover netting is undesirable in drifting areas. The fence which is generally desired is a sheep-proof one. The post should be of a durable nature. Charred pine posts are good posts to work and are durable. Pines which died several years ago made ideal posts if charred. The posts should be spaced 10 to 12yds. apart and imbedded to a depth of from 20 to 24in., according to the soil; with a strainer at 15 chain intervals, or a little closer if hilly country is encountered. Corner posts should be securely strutted with substantial struts, morticed into the middle of the post. 3ft. 4in. is a suitable height for a fence.

Wires.—The 12½ gauge H.T. 850lb. breaking strain is an economical and serviceable wire, and if a six-wire fence is erected it provides an ideal fence. This wire is considerably cheaper than any other, and experience shows that it is quite serviceable; other wires similar to the one mentioned should be avoided.

The six-wired fence is preferable to the five-wired one often used, although the latter is quite serviceable if a low fence is decided upon. Suitable gaugings for wires are from ground: 6in., 6in., 6in., 6in., 7in., 9in.

After affixing the wires—including a good barb as the top wire—two Crimple Cyclone droppers of No. 4 gauge should be tied between each post. This provides a good, strong and cheap fence, which will hold all stock worth keeping. The material necessary for such a fence can be obtained for approximately £7 10s. for wires, plus £1 10s. for droppers and loops.

Gates.—Gates should be provided at convenient intervals. The gate commonly known as a one stick gate is convenient, and could be used in often-used gateways.



Wire gates strongly made and provided with a handy catch provide all that is desired. It is worth remembering that a gate is the strength of a fence; therefore, a weak gate is a weak fence.

If one sheep crawls through a five-wire fence, becomes foundered and dies, the value of the sheep lost would have been enough to purchase sufficient wire to put in the sixth wire for one mile. It is better to spend a month fencing than a fortnight shepherding or chasing stock. Also, bad fences induce young stock to break out, and once the habit is cultivated even good fences will not hold the culprits. Last, but not least, bad fences make bad neighbours.

Meadow Hay Making.

[I. Sims (Glencoe).]

My experience with cows is that grass hay is a necessity. More than one advantage is to be gained by feeding with grass hay. If a cow is given a good feed of hay every morning she is not nearly so hard on a paddock of young grass.

In working paddocks for grass hay always top-dress with ½ bag super. per acre with the first rain. Feed off those paddocks as heavily as possible until the end of June, saving the other paddocks as much as possible. Then harrow them, using the harrows upside down to break up the manure and lumps. Care should be taken during the work to pick up any pieces of wire, sticks or stones which might cause a breakdown on the grass mower later on.

Shut up a paddock for hay as early as possible, as it allows the grass to make good growth and to mature much earlier than if it is shut up later in the year. Also one seems to miss much of the rain in the late spring and early summer. Cut the hay about the 11th or 12th November. Judgment is needed at this time. Some classes of land ripen off grasses more quickly than others. Grass should be cut when the squashy texture has left it. It is much better to cut grass a little on the green side than to let it dry. Dry grass loses its feed value very quickly.

Raking.—A lot depends on the weather for this work. If there have been a few fine days before the hay is cut, it can be raked much sooner than if it is cut as soon as possible after rain. If the grass is on the green side, it requires a good hot day before it is ready to rake. If one follows the mower with the rake too soon, the hay will not mature but will remain wet on the ground. The haycocks should not be too large—a little more than one rake-full to each cock—and should be well built. A good cock will withstand a lot of rain without spoiling.

Carting.—After 3 or 4 days turn over a cock here and there throughout the paddock. If all the moisture had dried out of the hay next to the ground, it is ready for carting. To be on the safe side take a handful and twist it in the hand. If it does not show any moisture it is ready to cart. It usually takes about a week to get it to this stage, providing the weather is good, although sometimes very drying weather occurs and the hay is ready in 3 or 4 days.

Stacking.—Make stacks about 4yds. wide —no wider. The walls are about 12ft., and the length depends on the quantity of hay. The roof should be well built, keeping the middle very high. This method has been in use for 7 years and the hay has never been spoiled by wet.

Thatching the Stack.—Thatching with cutting grass saves the hay from being spoilt by rain.

FARMING FINANCE IN MARGINAL AREAS.

[By a member of the Wudinna Branch.]

The subject of farming finance may sound a little dry, but it is a most absorbing topic and one to which farmers generally may turn their attention with benefit. Too little has been thought of by farmers about the financial part of their business, and it is generally only when a farmer is up against it that he begins to think seriously about his financial position and how he is going to straighten it out. Once a farmer becomes seriously involved, there seems to be only one way out, and that is by hard work and rigid economy, together with more work and more economy. But, although hard, it is possible for a farmer to prevent his position from becoming involved and, at least, the problem can be tackled from this aspect, to try and keep out the difficulties.

The first and most important thing to remember is that farming, in marginal areas at any rate, is, to a large extent, a gamble; that seasons and markets fluctuate violently from year to year. This factor has probably been the stumbling block of some of those who, it is regretted, have not made a success of it. There are other factors, too, but this is the chief. Seasons and the markets cannot be controlled, but finances can be arranged accordingly, and this can be done by taking a long range view of the position and basing finances over a long period of years.

To set himself up in the first place, a farmer must either purchase a property already improved, or take up a more or less unimproved block from the Government. Most scrub blocks are taken up from the Government by young men with very little capital, or at least, with very limited means, in some cases with very little plant. The trials and pinchings and scraping of these young men in their endeavours to carve a farm out of the heart of the mallee would make an epic in Australian farming history. Too often are they forced to abandon their task and leave the fruits of their labour to someone else. Their vicissitudes of fortune are many and varied and their financial circumstances and systems of getting their block into production are so widely different, that any golden rule cannot be laid down to financial success. Only earnestly we may plead with them to proceed very, very cautiously and not give up their sharefarming operations or outside work, very often carried on at the same time, until their block is a going concern. If possible, too, rather than launch out on a new machine, to keep the £50 or £100 in reserve, if they can. It may be handy at some time for seed and super. No one is keen on advancing money on a rough scrub block only partially cleared, with the stumps not dead; and that young farmer will be well advised to keep a small reserve in hand to carry over a poor year, if it is humanly possible.

If a farm already improved is purchased, the suitability of the property and the price paid are the two important factors. To begin right, the farm must be bought at the right price. A difference of half a crown an acre may be the difference between profit and loss. There is only one way to value a farm, when purchasing, and that is on its productive value and not on the price that land is being sold in the district at the time. It is of little use taking the price of wheat and wool at the time of purchase as a basis, but a good guide can be obtained by taking the average prices over a number of years. It is interesting to note that the average price of wheat at Australian ports for the years 1907-1932 was approximately 4s. 10s. per bushel, which would mean 4s. 4½d. at Wudinna. However, this price cannot be taken as a guide, as it includes the boom war period and does not include the latter years of the depression. Working with the average yield of the farm or the district and estimating the number of acres to be put in each year and deducting the estimated expenses will give the average income per annum from wheat, and the income from sheep may be treated in a similar manner. Deduct from the total income an amount for own wages and the result, capitalised will be the value of the property. It is usually alarmingly small and in some cases, it has been noted, the production value of a farm is actually less than the cost of the improvements upon it. This method will give the value as a freehold and deductions must be made to meet the case when a property is under Agreement to Purchase from the Crown or is Crown Leasehold.

This gives rise to an interesting point in connection with farms of low yielding capacity. As mentioned before, many properties valued on a production basis as freeholds are not worth much more, or not as much in cases, as the value of the improvements. If the property is leasehold of any type, incurring the annual payment of amounts to the Government, it is impossible, on the face of it to be a paying concern; and the moral to be derived from this is, do not over improve the farm, especially if it be in a low yielding district. There are farms, in other districts, with paved yards and stables, painted barn doors and £2,000 houses, all put there in good years and paid for, but the farmers have neglected to take a long range view. Poor seasons and prices have returned, farmers have had to borrow money to carry on and are astounded when, with £3,000 to £4,000 worth of improvements alone on their properties, they can only borrow £2,000 on its security. This is because farming is a business, and a farm is only useful for what it can produce. The £2,000 house, the paved stables, and the painted barn doors are of no more value than any other houses or stables from a financial point of view. It would have paid the farmer to have kept his money at interest to use over the lean years, which, in low yielding or marginal areas, are bound to come.

The same thing applies to implements, and if a farmer has a 1,500 acre property, it does not pay him to have a plant capable of working a 3,000 acre property. On the other hand, it does not pay him to be short of the essential implements. The remarks about paved stables and painted barn doors must not be construed to mean that improvements and implements must not be taken care of. Care of implements and improvements is one of the biggest factors in cutting down costs.

The lack of ready finance itself has been sufficient in this district to check the expenditure, in most cases, on over improvement. But beware when prosperity returns and the farmer, cash jingling in the pocket, sees a new implement which he has set his heart on. If, of course, it is a machine which by going to pay for itself in several years in the extra amount it produces or by the amount it saves, then rush straight in and buy it before spending the money on a new car.

In estimating his returns, a farmer too often loses sight of the fact that he has capital invested in a property and that the capital should return him at least 4 per cent. or 5 per cent. over and above his living. The matter is more easily explained by taking, as an example, a retired farmer who is tired of doing nothing and wishes either to get a job or go back on the land. Say he has £8,000 invested at 4 per cent. If he gets a position at £5 per week, his income will be £260, plus 4 per cent. on £8,000, £320, total £580, and he would be fairly certain of getting it. If he purchases a farm of 1,000 acres at £7 per acre and invests £1,000 in a plant and sundries he should, therefore, be certain that the farm he purchased should be capable of giving him an average income of £580 or more. Otherwise, it would pay him not to take the risk of farming, but to keep his capital invested and stick to his job.

In setting out to develop a property in an unimproved or partially improved state, there is always one main factor to be kept in mind, that is, the improvements come first which bring the first returns. That is elementary and is usually carried out up to a certain stage. No one would expect to begin improvements by building an expensive house before any clearing was started, and no one does, but too often is money used for this and other purposes before the property is in full productivity. When a farm has been properly cleared and sheep-proof fenced and subdivided into as many sheep-proof paddocks as practicable, with water reticulated to all paddocks, then and then only has the farm reached the stage of full productivity, and all this work on the land—the land which produces the money, would appear to be desirable before any other improvements of a permanent nature are proceeded with. It is of very little use trying to pay for unessential improvements of a permanent nature out of annual farm income, if that income is only portion of what it will be eventually. Get the means to the income first to provide the wherewithal for further improvements.

When the income is coming in, attention may be turned towards cutting costs, and in this connection the blacksmith shop and sheds and barns could be gone on with. And when costs have been cut to a minimum, by building protection for implements and horses and the provision of time and money-saving devices, then it is time to think about building a decent house.

The most outstanding thing about farm finance in marginal areas, particularly in mallee districts, is that it is practically impossible to carry a heavy load of debt, that is, a debt proportional to the maximum amount a farmer could carry in a more certain rainfall area. A proportionately small debt is easy enough to manage, but so many times has the man with a large amount of liability said "A few good years and I will be out of it," but it seldom comes to pass. It cannot be expected to pay off in a few years a debt of many years accumulation, with interest commitments now probably as large as the first amount borrowed. The proceeds of a good crop would very likely pay off a good portion of a farmer's liabilities, but then there are carry-on moneys, rates, taxes, and interest to be provided for the ensuing year, and one has yet to see the farmer operating on one block, who can reduce his liabilities more than £1,000 in five years. The vagaries of the seasons in marginal areas most often make a farmer slip back £300 this year, of the probable £500 he picked up last year, but as long as he is picking up gradually a little more than he is slipping, he is doing well and it is only by a long sustained effort that a farmer can meet a large interest bill and gradually pay off the principal.

The long sustained effort of picking up arrears can be eliminated if a hard struggle is made at the beginning. It is often very hard, but once it is over, it should end all a farmer's financial worries. The struggle is to pinch and scrape in the beginning when in a small way and establish a reserve of say £200 which if put aside for the year which is a failure, enables one to carry on without going into debt. As soon as another good year comes, put away a similar amount again. This sounds like a fairy story, but it is not given as theory. This has been carried out in practice by men who started from scratch. Those who have carried it out are in flourishing circumstances to-day, but they had a pretty hard fight in the beginning.

A farmer cannot hope to make rapid progress when, besides having to provide moneys for carry-on, he pays rates and taxes which are out of all proportion to the services received from them, and then pays out anything from £50 to £100 for interest. This amount of interest would, in the ordinary course of events, be a farmer's profit and it must be his first endeavour to wipe off this tax on his labour. But it might be said—if he has bought his farm at the right price and he runs it properly, it should be capable of earning this amount of interest. That would be so providing that seasons were uniform and prices were always payable, and last, but not least, that his other commitments were uniformly spread over each year. A man cannot be indebted up to the hilt and make good when his income and outgoings vary considerably from year to year. There will always be a year or a series of years when the income does not cover the outgoings. Further borrowing to meet the deficiency means a bigger interest bill, and as he is already up to the hilt—disaster.

The matter of annual commitments referred to above, calls for a little attention.

There are rates, taxes, interest, and seasonal cropping expenses, all fairly uniform amounts each year, and amounts which can be fairly charged against the respective season's crop returns, but there are other amounts which entail the repayment of principal, and once they are paid, in effect, form an addition to a farmer's capital. In a good year when these amounts can be met, an increase in capital is most desirable, but in indifferent years, an unwise accumulation of these payments is a very dangerous thing. This refers to payments on Shed and Tank Loans, Instalments on Crown Agreements to Purchase, Fencing and Netting Loans, and Advances to Settlers, all of which involve a repayment of principal as well as interest, and payments on machinery bought on terms. The former items are spread over a long term of 25 to 30 years, and the latter are paid in large amounts over a period of not more than four years. It is very often necessary for a farmer to avail himself of the above methods of purchasing his land, sheds, fencing, and machinery, but, however necessary it is, it must not be overlooked that it is not a good thing for a farmer to commit himself to the repayment of principal over years when he may not be able even to recoup his working expenses. The past few years have been a lesson in this respect. There are farmers who have all the above-mentioned obligations, and their plight during these years in being faced with the repayment of capital when their crop proceeds did not even cover expenses, has been most unenviable.

In the old days, farming was an occupation where a farmer settled down on a property and earned his living. It did not concern him whether it paid him or not. But now it is a capitalised industry, and it is interesting to compare it with, say, a manufacturing industry.

In a factory, particularly where expensive machinery is used, the works never stop. They work three shifts right through the 24 hours of the day to get as much out of it as possible. As in farming, interest plays an important part in their profits They pay interest on borrowed money for their plant for 365 days in each year and for 24 hours in each day. Every hour means money to them and, therefore, they have to make every hour pay for its portion of interest. They squeeze every penny they can out of the plant they have at their disposal and they have maximum production. It is pleasing to note, as a matter of fact, that quite a number of farmers here have gone very close to maximum production, but there are still many properties which could be worked to better advantage. Maximum production will only be reached when our native and other grasses have been replaced by more useful fodder grasses. Half as many sheep again are carried on farms sown to pasture, and the increase in sheep carried has tended to improve the land for cereals. Therefore, if

Delegates at the Men's Session of the Upper North Conference, Booleroo Centre, 21st July.

income is increased through maximum production by one half, standing annual charges will be spread over this larger amount and will, in effect, be reduced by one third. One cannot afford to have his farm at anything but full productivity.

It should be the aim of all farmers to keep their liabilities to a minimum, and once they are established, and before going in for luxuries and comforts, to work with the aim of accumulating a fund, not for a rainy day, but for a dry year. There is only one sure way to sound farm finance, as any other finance, and that is by steady effort and rigid economy until one gets ahead of it, and when he is ahead of it, by expenditure only on items which are sure and proved income producing.

Dairy Farm Competitions, 1936-37

The following are the results of the various competitions conducted under the auspices of the South Australian Committee of the Australian Dairy Produce Board :—

MURRAY SWAMPS DISTRICT.

Aggregate Results.

Sectional Judges.—Conservation of Fodder and Pastures, H. A. Follett (District Agricultural Adviser) : Dairy Herd and Farm Management, H. B. Barlow (Chief Dairy Instructor).

Position.	Name.	Conservation of Fodder.	Pastures.	Dairy Herd.	Farm Management.	Aggregate.
		150.	200.	150.	100.	600.
1	Gale, W. T., Tailem Bend	97	178½	128	86	489½
2	Goyder, W. G., Long Flat, Murray Bridge	92	171	122	88	473
3	Wise & Son, E., Jervois	85	174½	124	85	468½
4	Fromen, V. E., Jervois	93	165	116	88	462
5	Hutchinson & Eagle, Jervois	99	161½	127	70	457½
6	Baldock, J. W., Long Flat, Murray Bridge	56	176½	110	82	424½
7	Jericho, H. H., Jervois	70	159½	108	76	413½

SOUTH EASTERN DISTRICT.

Aggregate Results.

Sectional Judges.—Conservation of Fodder and Pastures, E. S. Alcock (District Agricultural Adviser) ; Dairy Herd and Farm Management, H. B. Barlow (Chief Dairy Instructor).

Position.	Name.	Conservation of Fodder.	Pastures.	Dairy Herd.	Farm Management.	Aggregate.
		150.	200.	150.	100.	600.
1	Wray, J. M., Hynam	126	170	136	85	517
2	Caine, F. C., Kongorong	125	172	120	85	502
3	Allen, A. H., Wandilo	121	161	129	86	497
4	Stuckey, Mrs. G. D., Rendelsham	128	170	111	84	493
5	Moritz Bros., Kalangadoo	131	161	115	78	485
5	Chambers, W. K., Mil Lel	136	171	98	80	485
7	Dean Bros., Kalangadoo	108	152	115	86	461
8	Bartlett, M. J., Moorak	70	162	134	83	449

Lower North Pruning Championships

WATERVALE, 7th JULY

VINE SECTION.

JUDGES.- -Messrs. E. Teusner and W. Bietz.

Competitor.	Branch.	Bush. Spur. 100	Trellis. Rod and Spur. 100	Total. 400
A. T. Leske	Williamstown	90	97½	187½
E. B. Kruger	Light's Pass	94	92½	186½
H. O. Helbig	Greenock	91	94	185
W. Ahrens	Light's Pass	88½	94	182½
L. Ward	Lyndoch	88½	93½	182
F. H. Schulz	Koonunga	91	90	181
A. Smith	Watervale	88½	92	180½
F. M. Elliott	Williamstown	92½	87	179½
H. Linton	Light's Pass	89	90½	179½
A. Obst	Greenock	88	91½	179½
J. Brysky	Watervale	90½	88	178½
J. B. Helbig	Greenock	85	90½	175½
A. Heintze	Koonunga	83½	91½	175
F. Linton	Lyndoch	85	89½	174½
R. Deane	Lyndoch	88½	85	173½
G. C. Cartwright	Koonunga	84	89½	173½
B. Fromm	Lone Pine	85½	88	173½
G. Dowdell	Williamstown	85½	86	171½
G. Merritt	Penwortham	81½	87½	169
K. Grace	Watervale	84½	82	166½
C. A. Hoffmann	Lone Pine	79½	86½	166
A. Andriske	Lone Pine	74	87½	161½
F. Nayda	Penwortham	76	82	158
M. Morrison	Penwortham	78	78	156

TREE SECTION.

JUDGES.—Messrs. J. B. Harris and H. H. Orchard (District Horticultural Advisers).

Competitor.	Branch.	Prune. 100	Pear. 100	Peach. 100	Apricot. 100	Total. 400
A. Smith	Watervale	88	94	92	90	364
E. Auricht	Lone Pine	92	90	92	89	363
W. H. Penna	Penwortham	92	86	94	90	362
F. Nayda	Penwortham	91	84	94	90	359
O. Burford	Watervale	96	85	89	88	358
J. B. Helbig	Greenock	90	89	89	90	358
A. Andriske	Lone Pine	90	87	86	93	356
C. A. Hoffmann	Lone Pine	85	97	86	87	355
V. Duke	Penwortham	93	82	88	92	355
L. Zimmermann	Greenock	85	92	89	89	355
W. Koop	Light's Pass	91	84	87	92	354
R. Schulz	Koonunga	87	93	80	94	354
D. J. Bain	Williamstown	89	96	81	88	354
E. B. Kruger	Light's Pass	90	85	88	87	350
F. H. Schulz	Koonunga	85	87	85	92	349
F. M. Elliott	Williamstown	83	88	88	88	347
E. Burgess	Watervale	82	91	88	85	346
C. F. Wilksch	Greenock	87	86	84	89	346
O. Kurtz	Light's Pass	84	88	78	93	343
E. Schulz	Koonunga	88	84	77	92	341

The Urrbrae Agricultural High School.

A recently published prospectus of the Urrbrae Agricultural High School contains detailed information of the conditions of admission, fees, curriculum, etc.

Boys who have gained the Qualifying Certificate and who desire to become primary producers—or to enter some allied occupation—are eligible for admission. The fees payable are the same as are paid at other High Schools (£3 per term), unless exemption is granted. Boarding accommodation at approved homes can be arranged.

Besides providing for a general course in theoretical and practical agriculture (crops, animal husbandry, and farm mechanics) the curriculum includes subjects of the intermediate and leaving classes for those who desire to sit for these examinations.

The school is situated near the Waite Agricultural Research Institute (Fullarton tram service.)

A copy of the prospectus giving further details will be sent on application to the Headmaster, Urrbrae Agricultural High School, Fullarton Road, Mitcham.

Activities of Women's Branches

The Editor will be glad to receive good photographs with which to illustrate papers written by Bureau members.

PASSION FRUIT CULTURE.

Mr. A. G. Strickland, M.Sc. (Chief Horticulturist) supplied the following information in reply to a question on the growing of Banana Passion Fruit, which was submitted at the Women's Session of the Lameroo Conference:—

The common purple passion fruit (*Passiflora edulis*) and the banana passion fruit (*Tacsonia molissima*) are closely related, and general treatment is similar. The chief difference is that the banana passion fruit being of relatively inferior quality, vines of this species are mostly grown as ornamentals. Mode of training, of course, will depend, in the case of either variety, on whether the vines are grown primarily for fruit production or as decorative plants. The principal points in securing good results in the cultivation of passion fruit may be summed up as follows:—

It is desirable to have a good, rich, free working, well drained soil located in a place not subject to very heavy frost during the winter months, as these plants are very readily injured by severe frosts.

The general method of raising Passion Vines is to take the seeds out of good types of fruits and sow them straight away—before they have had time to dry out—in boxes or sheltered beds made up of good, free, sandy soil, which can be kept well watered. The seeds are covered to a depth of about ½in. with loose soil made up of sand and rotted manure, which is pressed fairly firmly on to the seeds.

The seedlings, when sufficiently advanced, that is, when they are four to five inches high, should be transplanted either into boxes or pots in the first case, placing them about four inches apart, so that they may be lifted with a ball of earth when ready to go out into the orchard. They are planted in rows very much like grape vines are, the rows being nine or ten feet apart to allow for implements to cultivate the soil, and the plants are set out from each other in the rows about six to eight feet. They are trained somewhat fan-shaped on a trellis resembling a three-wired fence, and about the same height as an ordinary agricultural fence. Plants may be bought from nurserymen at about sixpence each, and set out of the pots without receiving any check.

The best time to set these plants out is in the early spring time, when most of the frosts are over, but they should be watered about once a fortnight for the first three months, if it is only a matter of giving them a bucketful of water. The tillage necessary approximates to that usually given grape vines; whilst the pruning consists of cutting out exhausted shoots as they accumulate, thus keeping up a supply of laterals on which the fruits are carried.

All dead and diseased wood should be removed, long straggling laterals cut back and weak spindly growths entirely removed. This work should be done after the summer crop has been harvested.

Manuring.—Firstly, soil humus or organic matter should be maintained by means of application during winter of well rotted stable manure, or in the case of larger areas of vines where sufficient stable manure cannot be obtained, by growth and ploughing under of green crops. If stable manure is liberally applied, no further manuring will be necessary; where, however, growth is not satisfactory, 1 to 3lbs. of 2:2:1 mixture per vine may be applied in early spring with advantage.

ALAWOONA.

At the June meeting Mrs. Cooper spoke on The Care of the Home. Mrs. Wright read a paper Food Values at the meeting held on 16th July. Mrs. Watson won the Cake Competition. (Secretary, Mrs. M. Cooper.)

AUBURN.

Household Hints.

The meeting of 28th May was held at the residence of the Secretary, Miss L. Dennison and took the form of a Question Box:—

Should pastry for fruit pies be put on with the fruit, hot or cold?—Ans. The fruit should be cold.

Will a short crust made from good dripping suitable for pies and pasties keep in the dough for a week? Ans. Yes, use plain flour rub in dripping, and mix with water and the juice of a lemon, roll out and spread with butter or dripping two or three times, roll in greaseproof paper and keep in a cool place.

What is the cause of large holes in gem scones?—Ans. The oven too hot.

What is the best way to take marks off a polished table?—Ans. Use Spirits of Camphor. Can Georgette be washed?—Yes, wash in Lux, and pull into shape while drying.

What is the best way to clean a cream flannel garment?—Ans. Sprinkle with magnesia and petrol and roll up for a few days, then shake out. if very dirty spots make a paste of petrol and magnesia and leave until dry

What will prevent discolouration of lamp glasses?—Ans. Put a little methylated spirits in the water when washing them.

What makes a stove that has been freshly blackleaded go a greyish blue?—Ans. Try mixing blacklead with methylated spirits or turpentine.

Can fresh bread be made suitable for seasoning?—Ans. Yes, cut in slices and dry in oven.

BALHANNAH.

Seventeen members attended the June meeting, when each member gave a pudding recipe. On 21st July Mrs. Middleton read a paper, "A Trip to New South Wales." (Secretary, Mrs. Grow.)

BALUMBAH.

Members met at the residence of Mrs. Van Heyhuysen, each member displaying a plate of biscuits and recipe. Mrs. L. Wohling a pioneer of the district gave an interesting address. On 7th July the secretary, Mrs. H. Jericho, presented the annual report. Mrs. Van Heythusen gave a demonstration of re-footing a sock.

BEETALOO VALLEY.

On 17th May Mrs. Snoad gave a talk on "Glove and Rug Making," and papers were read from the *Journal*. Mrs. L. Pearce read the annual report at the June meeting. On 15th July the annual combined social of both Branches was held, and on the 26th congress delegates were appointed.

BELALIE.

The Annual Exhibition and Competitions were held on 15th June. The Minister of Agriculture, Hon. A. P. Blesing, M.L.C., opened the function and distributed the prizes to the successful competitors. (Secretary, Mrs. E. L. Orchard.)

BOOR'S PLAINS.

Art Needlework.

Miss Patterson read the following paper at the June meeting:—Art needlework is a gift as well as an art, and it is also a very pleasant pastime during winter evenings. The difference between the handling of the needle in plain sewing and in embroidery is chiefly that the latter requires the utmost care to ensure evenness and regularity. A careful study and practice of stitches will bring the worker more quickly to a sense of the pleasures to be had in creating articles with needle and thread.

A very good method to learn stitches is to practise them on a piece of cloth upon which an example of each new stitch learned is kept for reference. In selecting the work, procure the best linens, silks, and cottons. Myrat, Fautley's, and Semco linens are recommended, also C.M.S. Sirocco embroidery threads, and D.M.C. coloured and white stranded. Clark's stranded is very harshly toned, and is difficult to blend in the colours, and if one does not have a good blend, the work is not nearly so attractive. Fautley's recommend the use of Sirocco Art Silk, which gives a rich, permanent finish to needlework, whilst its wide range of beautiful colours are fadeless and boil-proof. Sirocco will stand perfectly, giving a coarse or a fine thread as desired. Hence the reason why workers the world over have chosen Sirocco as a perfect embroidery thread. There are quite a number of stitches, and one is never finished learning about needlework.

NEEDLES AND SCISSORS.

Be careful about the needles. In addition to avoiding injury to the material the work looks better if the right kind of needle is used. The mid-sizes of the crewel needle, No. 8, are mostly used in needlework. When threading a needle see that the twist in the thread will not run down from the needle in this way. The thread will stay twisted when working and will not cause trouble. A needlewoman must use a thimble to avoid pricking the fingers, which in time may cause trouble in getting the work soiled. A good pair of embroidery scissors is also a necessity. These scissors have long handles with short blades which are very sharp, and the threads must be cut very quickly and clean from the back to avoid dragging.

The back of the work must be just as neat as the front, and if the work is for exhibition always keep it in a pillow case to keep clean.

In keeping work it is advised to wash in a little borax, but do not starch or blue it, this tends to rot the linen when not in use. Knots must never be used—catch the thread to the linen at the back very neatly and cut cleanly.

STITCHES.

The most simple stitches in needlework are stem, backstitch, buttonhole, and lazy-daisy. Many variations and additions can be made with lazy-daisy. Applique is the first piece of work a student should commence, this work consists of chain stitch, buttonhole, S. stem, and satin stitch.

In doing coloured work always try to blend the colours. Do not work a red flower alongside of a purple one. Those shades may be used of course, but see that an autumn tint or a yellow is in between. When using pale shades see that they are all pale or *vice versa.*

There is, perhaps, no stitch and design for embroidery which is attracting more attention than the Indian filling. It is simple and quickly worked with delightful results, and presents no difficulty to beginners. It is a continuation of long and short stitches fitting into one another until the whole space is filled in.

A good effect of shading flowers can be obtained by the use of different shades in the petal, commencing light and working darker shades towards the centre.

Crochet is regaining its popularity and is useful in many cases where a person is unable to knit, and particularly for doyleys or edges on tray cloths, and finishing necks and sleeves of undies.

Knitting is very popular, as every occupant of the home can wear something that has been hand-knitted, pullovers, cardigans, etc. Paton's or Balwin's wools are recommended in 2, 3, or 4-ply, with fine needles in plain or fancy patterns.

Tatting is harder to learn, but when mastered the worker can make dainty insets or edgings for infants' clothes and underwear.

The Danish Hedebo embroidery is very popular. This work first originated from the Danish people in Holland. The work is done on Irish linen and worked with D.M.S., A-Broder, and white line thread, or double silk material, and worked in fibrone. The old-fashioned braid stitch is used a great deal in Hedebo and looks very pretty for a design with a large number of lines running on it.

Smocking is very popular and looks very beautiful on children's wear and ladies' underwear. When doing this work have the correct dot transfer and threads for working. When pressing the transfer see that the material and paper are quite straight, and so avoid the smocking being incorrect when complete. The thread recommended is D.M.C. coloured stranded, which is fadeless and boil-proof. If one prefers all cream threads, use 30 fibrone. White work, *i.e.,* Roman cut and richelieu embroidery never grows old. Roman cut is padded and then buttonholed with a beautiful thread, D.M.C., A-Broder, Red Label, No. 25. The richelieu embroidery has bars which are worked first and then the padding which after follows the buttonholing. When this work is washed and cut out it has a beautiful appearance.

Cake Icing and Decorating.

Paper read by Mrs. Measday at the July meeting:—A few points on icing that have proved very useful. Be sure and make the cake a good shape. When baking a square or 3-cornered cake get the mixture well down in the corners and the papers straight. First cut a piece of cardboard about 1 inch larger than the cake. This will save the decorations and be much easier to handle if the cake is to be sent or carried any distance. Next make the cake as level on the top as possible. If it has not risen it can be levelled with almonds or mock icing. The former is expensive and for ordinary use mock icing is just as good. This is made from the following recipe:—1 egg well beaten and 1 tablespoon butter, ½lb. icing sugar, ½ cup cocoanut. If too stiff add a little more yolk. Never add water or milk. Knead as for pastry dough on a board sprinkled with castor sugar.

It is a good plan to level the cake with this icing by putting on small pieces and building up. Then roll and the top will be quite level. Almond icing should be left several days to harden and the harder it is the less likely danger there is of the oil discolouring the icing. A little rosewater added to the almond paste saves the oil from coming through. Before putting on the almond paste brush over the cake with white of egg. The next day mix a little soft icing and put on a layer and let it dry well.

The next layer is the Royal and last coat. If the icing is mixed a little thinner and poured over the top it will fall into place and give a smooth and glossy top. It must

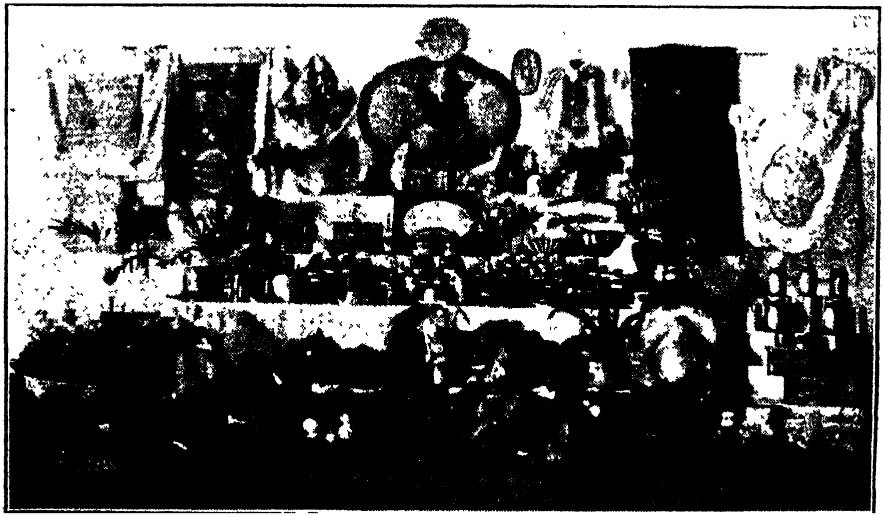


Exhibit staged at the Upper North Conference, Booleroo Centre, 21st July, 1937.

not be so thin that it will run down the sides. For icing the sides, the icing should be a little stiffer than for the top. If the back of a knife is used and it is run along quickly it will give a smooth finish. Do not worry about the edges, as long as the middle is smooth, for they are hidden with the decorations. Put the cake away for a day, or if done in the morning, it will set by night.

ICING.

The sugar must be the best, and kept in an airtight tin. Always sift the sugar. Royal icing recipe:—Whites of 2 eggs for one minute, 1lb. of icing sugar (sifted), gradually beating for 10 minutes, also add ¼ spoon glycerine and any essence favoured. If not using for some time, be sure and keep well covered. To obtain different shades use:—Egg yolk for yellow, blue bag for blue, cochineal for pink, blue and pink for mauve, blue and yellow for green, red and yellow for orange, cocoa or chocolate for brown, pink and a few drops of coffee essence for brick shade. (Secretary, Miss E. Stanway.)

CLARE.

The Flower Garden.

Thirty members were present at the April meeting when the following paper was read by Miss A. Lee:—

Gardening is a hobby or pastime that everyone delights in and even after a busy day, anyone who is fond of flowers will find relaxation and pleasure in the garden tending the wants of plant life.

A nice garden—even if small—adds to the appearance of any home, and as well as making the outside gay, provides cut flowers for indoor decoration.

For the very busy person with not much time to spare for gardening, ornamental trees and flowering shrubs with a bed or two of gay annuals in season is recommended. Spring flowering bulbs are very little trouble and will grow almost anywhere and flower well if left undisturbed and not planted in too rich a soil.

If the garden is large, a lawn is suggested with flower beds laid out according to individual taste. There are several lawn grasses, the most popular at the present time being Lippia, this needs very little cutting and is always neat and tidy in appearance.

A hedge gives a neat finish to any garden and provides shelter for the plants. Coprosma is a hedge that always looks well. When making a hedge of this do not cut the tops of the plants until they have reached the required height but keep the sides regularly trimmed. If a hedge is not favoured a row or two of shrubs can be grown, when once established these need very little care and attention, they are a good back ground and wind break for smaller plants and flowers. There are also many very beautiful flowering creepers and climbing roses that may be grown on fences and trellisses to provide shelter for other plants and to beautify the garden.

Garden paths should be fairly wide and can be rubbled, cemented, or crazy paving may be put down all of which save much time in weeding.

Flower beds should not be too large and should have an edging of some kind. Jarrah edging is very neat, although it tends to harbour slugs and snails, stones make a very effective border for flower beds and are very much used since rock gardens have become so poular.

To prepare the beds for planting dig deeply if the soil is very heavy, apply a dressing of lime and leave soil in rough lumps for a time to mellow. Ashes can also be used to advantage and if available a good mulch from the compost heap can be worked in with well rotted manure. Clay soil should never be worked in a wet condition, and such soil will benefit greatly and become more friable if roughly dug and left for some time exposed to the sun and rain. A good dressing of manure each year is of great benefit to clay soil. As soon as each bed of plants has finished flowering, remove plants, dig the beds over roughly and leave to sweeten before planting again.

Watering should be done systematically and a good soaking once a week is of greater benefit than daily sprinklings which tend to bring the roots of the plants to the surface where they are dried out by the hot sun and wind.

As soon as the soil is in a workable condition after watering, hoe the beds over well to conserve moisture, as well as keeping weeds down. Early in summer; before very hot weather sets in; all flower beds should be given a mulch of well rotted manure or leaf mould. This will let the water through, keep the soil moist and cool and save time in watering and the plants will thrive much better. When the summer is over, the mulch can be dug into the soil and will form an excellent manure for the next crop of plants.

Seedlings should be raised in shallow boxes or pans of light sandy loam in a sheltered position and on very hot days be sheltered from the sun with hessian or other suitable covering but once the seedlings are up, do not cover too closely or the plants will be weak and spindly. Home raised seedlings have many advantages over those bought, as they are often out of the ground for some time and may also be too old and large to transplant satisfactorily. After a shower of rain is the most suitable time to put out seedlings, but this is not always possible so in the cool of the evening is the best time. Have the beds moist and the soil worked down fine. Press the soil firmly around the roots and water well, if hot and sunny provide shade, sticking in pieces of shrub or trees so that every plant is shaded, is a very good method.

Every garden should have a compost heap. Collect all old plants, leaves, weeds, etc., and put them on this heap which when well rotted down will be of untold value for renovating flower beds, and mixing with loamy soil, sand, and ashes for pot plants. As such a heap is mostly rather damp, it will attract slugs, snails, and other pests but a sprinkling of lime will get rid of these and benefit the compost at the same time.

Slacked lime is of great value in gardening for keeping down pests, sweetening stale soil and loosening heavy soil, but must not be used in sandy soil as it has a binding effect in sandy soils.

Save all ashes and keep dry until ready to use, as they are valuable in potash, sift out the charcoal and save for potting purposes, and use the ashes in making up garden soil, where it has much value, especially in growing sweet peas. Soot is also of great value, it can be put around seedlings to keep away pests, and sprinkled over the flower beds and hoed in gives the plant a healthy green appearance and adds colour to the blooms.

Keep all spent blooms removed from the plants, this prolongs the flowering period as well as making the garden look tidier. Roses will bloom well during summer if the blooms are cut back to a plump bud pointing out from the bush, well mulched and regularly watered.

Perennial plants should be taken up every two or three years and divided and young shoots from the outside planted. Bulbs should be planted in beds to themselves otherwise they get water when they should be resting and will often decay. Antirrhinum, Larkspur, Hollyhocks, and Stocks are all hardy plants that must be planted in well drained soil, free from manure for best results. Sunflowers, Cosmos, Zinnia, Linaria, Larkspur, and Phlox give best results if the seed is sown straight into beds where the plants are to flower. Self sown plants of Portulacca and Allysum add variety to the garden if grown on the paths, in crazy paving or between the stones bordering the beds. Dahlias that have been left in the ground all the year or have been planted early in spring will produce a second crop of very fine autumn flowers if pruned back fairly hard during February and well watered and given some liquid manure. Dried fowl manure is of great value for this purpose. Sprinkled sparingly over the bed on top of the mulch each time the plants are watered, the goodness is carried down to the roots. This method is recommended for roses and other plants, except of course bulbs, and is much less work than making liquid and having to carry it to the plants in a bucket.

Clare Women's Show.

Mrs. John Christison opened the exhibition held on 1st May, which comprised antiques, cookery and preserves, knitting, crochet and handicrafts. Mrs. J. C. Dux, who has been president of the Clare branch since its inception 8 years ago, paid a tribute to Mrs. Christison's practical interest in the branch which now has 56 members.

"'Good wine needs no bush' is an old saying that might be applied to this little show of ours," says Mrs. Christison. "It brings out the talent in the district, and in many cases shows the ingenuity of the members."

Mr. J. C. Dux, president of Clare Agricultural and Horticultural Society, proposed a vote of thanks to Mrs. Christison and the judges, who came from long distances, and to those who entered exhibits for competition. He said that the Agricultural Bureau was doing good work in encouraging these shows, and his society would always stand behind them. Mr. T. P. Gillen (vice-president of the Agricultural and Horticultural Society) seconded the vote of thanks.

The general standards of the exhibits was praised by the judges. In the knitted socks section, the judges, Mrs. J. A. Lyons (Georgetown) and Miss J. Ballantyne (Gladstone) found the entries excellent especially in one exhibit of fine wool. One well-made pair of socks lost points, however, because the needle join showed in the line the length of the leg. Texture and colouring of the jams were highly commended by the judges of the preserves, Mesdames G. T. Freebain and N. B. McDonald, both of Snowtown.

Selection in the fancy work exhibits was a very difficult task, said Mrs. G. Smallacombe (Georgetown) and Mrs. I. W. Sparrow (Clare). The work was generally excellent. Particular praise was given to the exhibits by girls under 18. Mrs. Schmerl and Miss E. Dennison (Auburn), who judged the cookery entries, expressed satisfaction, especially with the standard shown in the exhibits in cakes, scones, sandwiches, and nut loaf classes.

On 5th June Mrs. A. H. Rogers gave a demonstration of dressmaking, and the annual meeting was held on 3rd July, 40 members were present. (Secretary, Mrs. A. Pollock.)

COONALPYN.

On 26th May members exchanged pickle. jam, and sauce recipes, and was considered one of the most interesting meetings yet held by the Branch. Messrs. R. L. Griffiths and F. C. Richards of the Department of Agriculture were present at the annual meeting held on 23rd June. Over 100 people attended. (Secretary, Miss E. George.)

COONAWARRA.

Five members gave papers on various phases of dressmaking, at the May meeting. A novel form of meeting, "A Mock Banquet," was held on 16th June; there being present 40 members. On 21st July members discussed subjects of interest to country women. (Secretary, Miss O. Lear.)

ECHUNGA.

Mrs. McDonald gave a demonstration of making boys' pants on 5th May. As the meeting was devoted to "Household Hints," Kangarilla members visited Echunga on 7th July. Mrs. M. Steer spoke on citrus fruits and Mrs. Tester referred to the good work Women's Branches of the Agriculture Bureau were doing. (Secretary, Mrs. Dennis.)

EURELIA.

Mrs. E. Wall, Secretary, presented the annual report, and read a paper, "Improved Times for Children."

GEORGETOWN.

The first Exhibition of Handicrafts, held on 14th April, proved a great success, and many attractive exhibits were staged. On 9th June Sister Harslett read a paper, "Minor Ailments of Children." At the July meeting Mrs. R. McDonald gave a demonstration and paper on "Spinning." (Secretary, Miss J. Crawford.)

GLADSTONE.

Thirty members attended the June meeting. The Secretary, Mrs. L. Sargent, read the annual report and officers were elected. During July Mr. J. B. Harris of the Department of Agriculture, gave a pruning demonstration.

HOPE FOREST.

Recipes were exchanged at the meeting held on 3rd June, and on the 12th July Mrs. Jeffris entertained members at a social afternoon at her home. (Secretary, Miss M. DeCaux.)

KALANGADOO.

Household Hints.

On 8th May Mrs. McCall gave a report on the Coonawarra Conference. The following useful hints were given at the June meeting:—

For Motorists.—Rub the windscreen of car with a cut potato, which will prevent the rain smearing the glass. *Cleaning Hint.*—When using petrol to clean fabrics there is always a line of dirt around the patch after cleaning. This can be prevented by adding half a teaspoon of salt to a saucer of petrol. To peel tomatoes quickly hold them on a fork over a flame. The skin cracks and then they are very easy to peel. This method is twice as quick as placing them in hot water. *When Boiling Beef.*—Put the joint into boiling water to which has been added 1 teaspoon salt and 1 tablespoon vinegar. This will prevent beef from shrinking, and will give it a good flavour. *Pour boiling water* over beef to roast before placing in boiling fat. This sets proteins and encloses meat juices. *To Remove Ironmould.*—Rub the stain with lemon juice and salt, then wash in the usual way. *When darning* socks or stockings, use a lisle thread with the wool, this strengthens the darn and doubles the wear. *Saucepan Hint.*—To keep pots and pans clean. Before placing saucepans or frying pan over flames, soap the bottom of them with soft soap, then the black washes off with the soap quite easily. If the pan is to be used over an open fireplace, soap the sides also. When sweeping a floor where there is likely to be fluff, sprinkle a few drops of kerosene on the broom. The floor will be swept cleaner and in almost half the usual time. Let cakes made with S.R. flour stand 10 minutes before putting in the oven. The cake will be lighter and the mixture more even. *To remove the smell of onion* from the hands, rub the hands with a little dry mustard. *If too much salt* has been added to soups or stews, place a whole peeled potato in it, and it will absorb the extra salt. *Before using new sponge sandwich tins* fill them with bran and put in a hot oven. Leave in till the bran is thoroughly heated. Remove bran, then wash tins in usual way. This will prevent cakes burning. *To Remove Fresh Ink Stains.*—Wash article at once in buttermilk or fresh milk.

The Secretary, Miss W. Dangerfield, read a paper, "Points Which Influence Show Judges," at the meeting held on 10th July.

KANGARILLA.

The annual report was read by the Secretary, Miss M. Steer, at the May meeting. On 7th July members visited the Echunga Branch, and on the 15th each member exhibited an article of farm produce and explained its making.

KARTE.

Curries.

The following paper was read by Miss G. Fiebig:—The object of using curry—like all other spices—is to bring out the flavour of other ingredients and to blend them, not to kill them. Raw and cooked meat, rabbit, fish, vegetables, eggs, etc., can be used for curry. All curries contain a sweet and sour element, which is accomplished by the blending of lemon juice or vinegar with chutney. Curries are usually served with a border of rice, and garnished with slices of lemon, parsley, or cress. Rhubarb will take the place of apple and banana may be omitted.

Curry Sauce.—1 onion, 1 apple, 1 banana, 1 tablespoon each fat, flour, and curry powder, 2 small cups water or stock, lemon juice, salt, 1 teaspoon cocoanut, 2 teaspoons sugar, chutney. Peel onion, apple, and banana. Cut into dice, banana into rounds. Melt fat, add prepared vegetable and fruit, and fry for a few minutes. Add flour and powder, mix in well. Add liquid. Stir until it boils and thickens. Simmer about 20 minutes. Add salt, lemon juice, cocoanut, sugar, and chutney. Add either cooked meat, cooked vegetables, cooked rabbit, cooked chicken, or cooked fish. Thoroughly reheat and serve in the usual way. The sauce can be strained before adding the meat.

Curried Rissoles.—½lb. cooked meat, 3 tablespoons cooked rice, 1 dessertspoon curry powder, chutney, stock, egg glazing, breadcrumbs, fat, lemon, parsley. Place finely chopped or minced meat, rice, and seasoning into a basin, add enough stock or water to moisten, shape into balls, using flour on the hands. Dip in egg glazing, toss in crumbs, and fry in fat until a golden brown. Drain and serve on hot dish garnished with a slice of lemon and parsley or cress.

Madras Curry.—1lb. steak, small apple, onion, banana, 1 tablespoon sultanas, 1oz. flour, 1 dessertspoon curry powder, 1 cup water, lemon juice, salt, sugar, mustard, chutney, boiled rice, slices of lemon. Make curry sauce. Add meat, cut into small pieces, and fruit. Simmer gently until meat is tender. Add lemon juice, salt, sugar, mustard, and chutney. Thicken with flour and the curry powder, and simmer for a few minutes. Serve in the usual way.

Curried Chops.—4 neck chops, 1 apple, 1 onion, 1 tablespoon each fat and flour, and curry powder, salt, sugar, mustard, lemon juice, 2 cups water, boiled rice. Melt fat in saucepan, fry chops until brown on both sides, lift out, add diced onion and apple. When brown, add curry, flour, salt, then water, and lemon juice. Stir until boiling. Return chops to saucepan. Simmer until tender. Serve in usual way.

Curried Rabbit.—1 rabbit, 1 onion, 1 apple, 1 tablespoon curry powder, water or stock, seasoning to taste. Wash and joint rabbit, cut apple and onion and fry in butter or fat. Add rabbit and fry until brown. Remove the rabbit and put in a saucepan, then add curry powder to the mixture in frying pan and fry this. Add to the rabbit, barely cover with water or stock, and cook for 1 hour. Thicken with flour to which has been added a few drops Parisian essence and ½ teaspoon Worcester sauce. Place on a dish and pile round with boiled rice. Serve with chutney.

Curried Patties.—Curry sauce, ½ cup finely-chopped cold meat, cold chopped vegetables (if liked), little chutney, pastry cases. Make curry sauce, add to it meat, vegetables, and chutney and thoroughly reheat. Have the cases cooked, fill with curry mixture. Return to oven to heat thoroughly. Serve on plate with paper doyley garnished with sprigs of parsley. Ideal for afternoon tea and suppers.

Curried-Sardines.—1 tin sardines, 1 onion, 1 dessertspoon curry powder, 1 tablespoon flour, 1 gill stock or water, salt, cayenne, lemon juice. Chop onion finely and fry in oil from sardines, pour off oil and add curry, flour, salt, and cayenne. Pour on stock or water, add lemon juice, place sardines in bottom of prepared dish, pour sauce over and sprinkle with fine breadcrumbs. Place in hot oven until brown. Serve with boiled rice.

On 26th May members met at the residence of Mrs. A. Gum. A paper, "Cream Puffs," was read by Mrs. W. Gum. The annual meeting was held on 23rd June. Each member brought a "Honey Recipe." A social evening was held on 10th July, and a paper, "The Farm Mutton Supply," was read from the *Journal* on 4th August. (Secretary, Mrs. F. Atze.)

KOOLUNGA.

Dressmaking.

Thirty-two members were present at the May meeting, when the following paper was read by Miss Fuller:—Dress must be considered from three standpoints, to protect, to conceal, and to display. The first consideration is to protect. The dress must protect from heat or cold—the garment worn should be suitable to the weather, not the season. The second consideration is to conceal, not only for modesty's sake, but it should be so arranged in all its lines and draperies to conceal any defects. Colour also does something in attracting attention from defects. Thirdly—Dress is to display and to reveal all the beauty and symmetry of the figure. The craftswoman depends as much on colour as form in this part of the work. Horizontal lines or trimmings decrease the height and increase the breadth; vertical lines add to the height and decrease the breadth. Therefore, a short, stout lady should avoid all horizontal lines and observe her waistline, and not wear a belt. "V" shaped effects—so disastrous to the appearance of a very thin woman—are worn with good effect by stout people. No ornament should be put in for ornament's sake and without a reason for its appearance.

If the aim is to produce a garment rich and gorgeous in its effect, it is futile to try and get it by decking a cheap material with much coloured trimming. If the richer materials are not within reach, it is quite possible to make a dainty and beautiful ball frock from modest materials, but the material must be consistent with the effect desired.

Treat clothes with respect if you would have them look respectable, and remember that clothes, to a reasonable degree, express the character of the wearer.

Cutting Out.—Always find the economical lay of the material; that is to say, lie the patterns on so that they fit into one another. Beginners frequently cut out two pieces for the one side, but if you always have material double with two right sides facing, or two wrong sides facing, this will be avoided. Before cutting material, examine it to find which way the nap or pile, and the flowers run. Let the surface smooth downwards and flowers run up. There are exceptions to the rule that surface smooths downwards, *e.g.*, velvet is sometimes cut with the surface smoothing upwards on each piece. This gives a warm, rich appearance. Frills, bands, folds, and ruches cut on the cross; box-pleating and kilting cut on the straight.

Fitting.—First, do not spare any pains to make the work perfect in the first stages. A dress well tacked is half-made. When tacking a bodice together, care should be taken to make waist lines meet. When tacking shoulder lines together, have neck and armhole edges meeting, and stretch front shoulder into back. This is to give room for the stretching of the front shoulder. To enlarge armhole when fitting, let out the underarm seam and shoulder. Remember that a tight fit is not a good fit. *Seams.*—For thick materials a single seam is best, stitched on the wrong side with edge turned in once and sewn on edge with machine, or over sewn, pinked or bound. *Double or French seam* for thin materials and lingerie. *Fell Seam.*—This is used where a flat finish is required, for such as underclothes, blazers, boys' shirts, and pyjamas. Use ¼ reel silk for all woollen materials and heavier silks, fine silk for georgettes, etc., while cotton frocking should never be stitched with coarser than No. 40 cotton.

Pressing.—Weight and time are factors more to be considered than heat in obtaining the best results. An iron used too cool will shrink material. Always place a cloth between iron and material for woollen material. All pressing, when possible, should be done on wrong side of material. Press silk with only moderately hot iron. Remove shine caused in pressing by steaming. Mrs. Smith read a paper on "Teaching." The annual meeting was held on 17th June, and Dr. Crosbie spoke on "Contagious Diseases" at the July meeting. (Secretary, Miss T. Whitehorn.)

KYBYBOLITE.

On the 20th April, Mrs. J. Wray spoke on "A Trip to New Zealand". Dr. H. Pavey of Naracoorte addressed the May meeting and Mrs. W. C. Johnston gave a demonstration of Spinning at the meeting held on 22nd June. On 20th July, a farewell social was tendered to Mrs. Kekwick. (Secretary, Miss M. Moore).

LAURA BAY.

Two papers were read at the May meeting:—"A Day's Baking," by Mrs. R. Burke, and "Knitting," by Miss F. Barnett. On June 8th Mrs. A. Bowell gave a demonstration of "Paper Flower Making." The Secretary, Miss Blumson, read the annual report on 13th July.

MALTEE.

Miss R. Talbot won first prize in the Biscuit Competition held on 20th May, and on 17th June, arrangements were discussed for the Exhibition.

McLAREN FLAT.

Twenty-six members and 28 visitors attended the May meeting, when Mrs. F. Wilson spoke on a Trip to Ceylon. On 3rd June, Mrs. Maidment read a paper, "Soap Making," and members discussed "Household Hints." The winners in the Cooking Competition held on 1st July, were Mesdames Warren and Oakley. Mrs. F. Crawford spoke on "Savouries," and Mrs. J. Foggo demonstrated "How to Bud Roses." (Secretary, Mrs. S. Elliott.)

MANGALO.

A social afternoon was held on 12th May. Each member at the June meeting exhibited a sultana cake and recipe. Mrs. Mrs. H. Olsen's entry being judged the best. Mrs. Cleam gave a demonstration of making Puff Pastry on 14th July. (Secretary, Mrs. B. Coles.)

MILLICENT.

Mrs. Redman gave an interesting talk, "A Trip to Korea" at the May meeting and on 11th June, a display of fancywork, knitting, &c., was staged. Miss Hutchesson was entertained at afternoon tea and presented with a gift on 25th July, in recognition of her services as Secretary. On the 16th officers were elected for 1937-38. (Secretary, Mrs. M. Redman.)

MONARTO SOUTH.

Miss E. Schnaars read a paper, "Puddings" at the June meeting and on 17th July, a Lamington Competition was won by Miss Strauss. (Secretary, Mrs. F. Liebelt.

MORCHARD.

Mrs. Martin gave advice on the treatment of cuts, and Mrs. C. Schutz spoke on "The Duties of Vegetables" at the May meeting. The combined social of both Branches was held on 30th June. At the July meeting Miss S. Twigden gave "Gardening Hints" and Mrs. Halliday, jun. read a paper, "The Home Decorator." (Secretary, Miss B. Twigden.)

MUDAMUCKLA.

On 19th May an instructive paper, "Making Better Uses of Potatoes," was read by Mrs. Noske. A social evening, to which members of the Men's Branch and visitors from Laura Bay, Maltee, and Murraminga were invited, was held on 28th June. The July meeting took the form of a "Question Box."

MYPONGA.

Mrs. Kiess read a paper, "Vine Cutting," at the April meeting. On 29th May a very successful Exhibition was held in the Institute. There were about 100 women present and 135 entries were read. Mrs. G. Connor, of McLaren Flat, opened the Exhibition. (Secretary, Mrs. M. Bounds). On 6th June the annual meeting was held, and on 31st July Dr. Pellew gave an address, illustrated with lantern slides, "The Far East."

NARRIDY.

Mr. B. Watson, of Crystal Brook, opened the Flower Show held on 29th April, which proved another successful function which this Branch has organised. The annual meeting was held on 5th June. The July meeting took the form of a "Question Box." (Secretary, Mrs. H. Siviour.)

SHEOAK LOG.

Sweet Making.

At the meeting held on 13th May the following paper was read by Miss H. Koch:—

Sweets are wanted in large quantities for children's parties or Christmas festivities, and it is an advantage to be able to make some at home.

The most commonly used sweets are coconut ice, butterscotch and various kinds of toffees, and in these kinds the sugar-boiling is the main feature. If well done, the syrup should be clear and smooth—however, if the syrup does crystalize the only thing to do is to begin dissolving once more. Colouring and flavouring are most important, and one must always be careful to have the colour and flavour to match: for example, pink colouring with raspberry, cherry or strawberry flavouring; yellow colouring, lemon, orange or pineapple flavouring. Dainty colours are the most attractive.

Many kinds of sweets can be made by using gelatine. An excellent sweet for a party is "Moonshine Biffs," as it can be varied so much by using different colourings and with the addition of nuts, glace cherries, preserved ginger, raisins or any other dried fruit. The recipe for this sweet is:—

One cup each sugar, water, and icing sugar, 3 dstspns. Davis gelatine, dessicated coconut, essence of vanilla. Soak gelatine in cup of water and place in saucepan, adding sugar, and boil 8 mins. Allow to cool, then add icing sugar and vanilla and whisk on till white and thick. Wet a plate or sandwich tin and pour in mixture. When set, cut in square and roll in coconut.

Another simple recipe is Chocolate Ruffs:—½lb. icing sugar, 1oz. butter, 2ozs. powdered chocolate, ¼ tspn. vanilla, ¼lb. coarse coconut. Melt butter, add chocolate and mix with a little boiling water, then put in coconut, vanilla and icing sugar. Mix well and place in small pieces on tray to set.

Hints for the Sweet Maker.—To prevent stickiness in toffee it should be boiled hard and not stirred, only shake the saucepan frequently. Sweets kept in an airtight jar will keep fresh for quite a time. To test toffee, drop in cold water, and if done it will be hard and brittle. Sweets attractively arranged in fancy boxes or baskets make very acceptable gifts. Toffee set in paper patties with half peanuts arranged in the form of a daisy on top, look nice. When using cocoa for sweets use half Bournville and half Frys, as this makes a good colour. Bournville cocoa alone is rather dark, while Frys is too light.

Savouries.

Miss K. Koch (Hon. Secretary) read the following paper:—

Nowadays savouries are more popular than sweets, and the perfect hostess is forever in search of new ideas. Many people regard savouries as difficult to make, but this is not so. Combinations of fish, meat, eggs, cheese, paste, pickles, sauces, lettuce can be used. Some of these will always be found in the house if unexpected guests arrive, and delicious savouries can be prepared in a very short time. The base of savouries can be pastry cases, cream puff cases, fried bread, biscuits, toast, white or brown bread. All savouries should be small and dainty and can be served hot or cold. For sandwiches day old bread is best cut very thin. Butter will spread easier if mixed with a little boiling water. Various savoury butters may be made, such as:—Cream, some butter and add a little salt, cayenne and a pinch of mustard, or add a little very finely chopped parsley, or a little anchovy essence to the butter.

Savoury puffs are very nice and easily made. Put 1½ozs. butter and ¼ pint cold water in saucepan and bring to boil. Remove from fire and add 3ozs. plain flour, which has been sifted with a little salt. Beat with a wooden spoon until quite smooth. Cool slightly, then stir in gradually 2 well beaten eggs, keeping the mixture smooth. Take small portions and drop on well-greased cold trays and bake in a moderate oven 25 minutes, or until puffs are quite dry.

A white sauce may be used as a filling with chopped ham and gherkin or flaked salmon added. These may be served hot or cold.

For a cold savoury a little minced meat, shredded lettuce and tomato mixed with a little mayonnaise makes a nice filling. Savoury biscuits can be split and spread with chutney or various kinds of egg fillings. This is a tasty savoury which may be sandwiched between biscuits or heaped on top. Take a saucepan and melt 1 tbspn. butter and add 2 chopped hard-boiled eggs, 1 tbspn. tomato sauce, 1 tspn. Lea and Perrin's sauce, 1 mustard spoon mixed mustard, pepper and salt. Mix altogether and when cold use as desired.

A rather novel savoury may be made by buttering some round biscuits and putting three or four cooked green peas in the centre. Whip some cream with a little salt and mustard and pipe a ring around the edge with an icing pump to form a bird's nest.

For a quick, sweet savoury, make some toast, cut in fingers, butter and sprinkle liberally with cinnamon and sugar. One of the most important things in serving savouries is to arrange them attractively, sprigs of parsley, small vine leaves and lettuce leaves may be used.

Mrs. Bowden gave an account of "A Trip to the North."

Thirty-six members attended the April meeting. Mrs. James gave a talk on "Beauty Culture and Hairdressing." Parcels of books were sent to Karte and Balumbah.

TANTANOOLA.

Dried Vegetables and Fruit.

Mrs. M. Telfer read the following paper at the meeting held on 6th April:—Dried vegetables are a good standby when fresh vegetables are scarce. Carrots, parsnips, turnips, peas and beans can be dried with success. I prefer dried beans to pickled ones, as the latter are salty and require a lot of soaking and washing before they are ready for use. The dried ones need only a few hours soaking and when boiled are equal to fresh beans. Drying:—Cut up as for ordinary use and dip in salted water; 1 tbspn. of salt to 1 quart of water; drain and put in the sun to dry. One hot day is sufficient to dry these. Store until required. Other vegetables can be dried the same way. I also dry apples the same way, and when soaked and cooked they are like fresh apples Prunes dry very well. These I dip in a weak solution of caustic soda and water, then in clean tepid water and dry the same way as vegetables. (Secretary, Mrs. G. Altschwager.)

WILLOWIE.

The Farmer's Wife.

Mrs. W. Foulis read the following paper at the June meeting:—This paper applies more particularly to farmers' wives in what is known as the fringe country, though it will apply to many farmers' wives throughout the State. The young bride comes to her husband's farm. The old house has been renovated. As old houses go, it looks reasonably good; some new furniture has been purchased. The home is comfortable as farmhouses go, yet lacking in electric light and heating power, gas stoves, &c. It has grown little by little and is not conveniently laid out. There is no bath room. Notwithstanding, the young wife is happy. Then she has other difficulties to contend with. The worries of a mother with a family; money is scarce and a few cows are purchased, the returns from which are to pay the maid's wages, if she is fortunate enough to find one. The maid slaves and milks the cows, but when the cows do not give enough milk the maid has to go, and leaves mother again struggling. Still she is happy with her husband and family. Time passes on, and the mother naturally thinks of her children's education. Finance, of course, is the obstacle. She gives them what she can afford, and very often goes without many comforts herself. So she gradually becomes careless of herself, gets tired, bad tempered, suffers from indigestion, and becomes more or less a nervous wreck, fighting against odds.

Farmers' wives should not have to work under difficulties; they should have reasonable comforts, something in keeping with their city sisters, and should only have to attend to enough cows and fowls to provide enough milk and eggs for home use. Women's work is in the house and not the sheds and yards. The farmer's wife should not be so tired that she is unable to go out freely and take part in social activities. They should also take part in some sport. These things make farm life much more pleasant, and would not prejudice folk against farm life like many are at present. "All work and no play makes Jack a dull boy."

Use of Citrus Fruits.

Paper read by Mrs. L. Mills:—Of all preserves, those made from the citrus fruits are perhaps the most economical, for, with the addition of so much water, a small quantity of fruit makes a surprising amount of marmalade. If possible, make sufficient marmalade to last right through the summer, when its distinctive and appetising flavour is most appreciated. Vary it also as much as possible with fruit that is available. Bitter oranges are generally most popular, and, important to the jam-maker, they also contain a greater amount of pectin and acid, both of which are essential for a good "set." Sweet oranges, lemons, grape fruit, citrons, all make delicious preserves, and can be used separately or in any favourite combination.

Fresh fruit is essential to success. Provided a few simple rules are remembered, every cook, however inexperienced, can be reasonably sure of success with marmalade. Though many of the recipes take 3 days to make, there is actually very little work attached to each separate daily process. The peel must first be cooked until soft in water, not in syrup. A preliminary cooking in syrup hardens the peel and is one of the most common causes of a disappointing marmalade. Use a very sharp, thin knife for shredding or finely slicing the fruit. Save the pips and put in a muslin bag. These contain quite a lot of pectin.

Recipe—Quick one day method.—This is the easiest recipe of all, in which the whole of the fruit is used. It gives a fruity marmalade, and can be made in one day. Sweet oranges or grape fruit can be substituted for the "Poor mans" or mixed with them in any convenient proportions. An orange or two (according to size) may also be substituted for the lemons. Ten or 11 medium-sized Poor mans oranges, 2 large lemons, 8lbs. sugar, 9 pints water. Clean the fruit and shred very finely, removing any pips. If time permits, cover fruit with the water and steep overnight. This is not essential, but often convenient for an early morning start. Put the cut-up fruit into preserving pan with the water and bring slowly to the boil. Boil slowly until peel is soft, and until practically half the water has evaporated. Two hours is an average time for boiling. Now add the sugar (previously warmed), stir until dissolved, and then boil rapidly for about 20 minutes or until a little will set when tested on a cold plate.

Lemon Marmalade.—To every lemon allow 1lb. sugar and ½ pint water. Cut lemons in thin slices, add water and stand over night. Boil until soft and then add sugar and boil 20 minutes or longer. Use fresh, juicy fruit, not over-ripe, cook first in water alone to soften the peel and finally in syrup for a brisk 15 minutes.

Uses of Lemons.—What drink is nicer in summer than a cold lemon squash, and in winter a hot lemon drink? With 2 aspros it is very good to break up a cold. The juice of 3 lemons, undiluted, and without sugar, will generally stop vomiting. Lemon juice in hot coffee relieves a headache. Equal parts of lemon juice and glycerine are excellent for an irritating cough. When cooking prunes, add the juice and rind of ½ lemon. To remove iron rust quickly and easily from any material, invert a medium heated iron, place on it the stained fabric, and gradually squeeze the juice of the lemon on the stain. The mark will be carried away by the steam. The juice of lemon added to blue rinsing water when washing white silk will keep silk pure white. Stains on hands can be removed by rubbing with lemon juice. A few drops of lemon juice on the tooth brush keeps the teeth perfectly white. Before squeezing lemons, place them in the oven for a few minutes, and twice as much juice can be extracted. The use of lemon juice in place of vinegar on fish, tomatoes, beet, etc., is a valuable digestive aid. A teaspoon of mixed spice in hot lemon will often break up a cold. (Secretary, Mrs. P. Foulis.)

Pinnaroo Line Branches Conference.

About 100 delegates from Smithville, Wilkawatt, Parilla, Parilla Well, Parrakie, and Pinnaroo, representing the Women's Branches along the Pinnaroo line, held their annual Conference at Lameroo on 3rd August. Mrs. A. Young occupied the Chair, and Mrs. H. Billing, of Wilkawatt, gave the opening address.

Worthy of special mention was the display staged by Mrs. F. R. Koch, of Wilkawatt, of 23 aprons made of various plain and fancy styles, illustrating how to utilise short lengths of material. Mrs. L. G. Wright, of Parilla, gave a splendid demonstration of making a door mat with binder twine. Mrs. H. Pritchard, Wilkawatt, gave useful hints on "Letter Writing."

Mrs. Pfitzner demonstrated the boning of a leg and fore-quarter of mutton. Miss E. Campbell, of the Education Department, spoke on "Foods and the Various Methods of Cooking."

LETTER WRITING.

Do your letters express you?

[Mrs. H. Pritchard, Wilkawatt.]

Have you ever thought what a difference a letter can make in a friendship? Do you know any people whom you like very much when you are with them, but who disappoint you when you receive a letter from them. Many friendships are "nipped in the bud" by these stiff, hard letters—more like copy book exercises than letters. What then is the secret of good letter writing? Do we need to have a special literary gift, a talent for description, and a fascinating wit? A letter can be quite brilliantly written and yet be cold and uninteresting. The special mission of a letter is to interest and please, and warmly greet the one for whom it is intended. Therefore, the two main things to remember in letter writing are expressing your true self, and to consider the tastes of the reader. A letter to be really interesting requires quite a lot of thought.

For instance, a letter that would prove very interesting to anyone living in the country, would perhaps be boring to a city dweller. Anyone who lives in the country loves to get little bits of city news. Then where there are children, plenty of news about other children, just for comparison's sake, is appreciated. A little preliminary thinking leads to an interesting letter. There is no denying that the interesting letter is the personal letter. It is meant for you and you alone and gives you that little warming up of the heart that the evidence of another's interest in you and your doings always imparts. How is one to "express" oneself in a letter? Just imagine yourself with the person to whom you are writing and write just as though you were talking to your friend. Let yourself go, and tell them just what is happening around you, what plans you are making; if you are a gardener, then put in a little gardening news; if you know your friend is fond of cooking, then enclose a recipe of some new dish you have just tried.

You avoid monotony in conversation by raising or lowering the voice, by questions, by gestures. Introduce the same tricks into your letter. Never omit a question mark (?), an exclamation mark (!), inverted commas (" "), and different paragraphs for different subjects—all these help to make a letter.

Do remember to write legibly. So often quite delightful letters are spoilt by their being badly written. Always use a pen, no matter how convenient a pencil is. Choose pretty and dainty stationery: It is always appreciated and it can be purchased at a reasonable price. Never write a letter unless your temperature is normal. If you are in a fit of the blues you may write something which you will regret later on, and may never have the opportunity of clearing up any misunderstanding that may arise in the reader's mind. Try to cultivate the habit of interesting letter writing, then you will never be guilty of only answering the letters that you really have to. There are many people in this world to whom we can all give much pleasure by the simple means of a letter.

CITRUS IN THE HOME GARDEN.

[Mrs. J. Steer, Wilkawatt.]

Prepare the ground for the trees at least a week previous to planting. Dig a fairly large hole. In heavy soil place bricks or stone in the bottom and plenty of old grass on the top; this prevents the soil packing in between the bricks or stone and so makes a good drainage, which is very essential in heavy soil. There are more trees lost by amateurs through bad drainage than any other cause. After placing the bricks and grass in the hole, fill up with light soil, stable manure, and as many old plough shares or pieces of iron as are necessary to provide sufficient iron to each tree. A light sandy loam is preferable.

Planting.—The actual planting of the tree is very simple. Be careful not to remove the soil or the bag from the root, but just cut the string and place the tree to the same depth as it was in the nursery bed. A good plan is to put an old cultivator disc underneath to stop the tap root from going down. This forces the young tree to spread out its surface fibrous roots, from which the tree gathers the necessary nourishment to develop its fruit. When the tree is well rooted and starting to make fresh growth it requires a little artificial manure. The best mixture for this is one part blood manure, three parts bone dust, and two parts sulphate of ammonia. Allow 1lb. of the mixture to each well growing tree, but on no account give artificial manure until the tree is well rooted. When cultivating around the trees, make a shallow trench, bigger round than the tree itself. Water well, then manure, either with the dry mixture or dissolved in a gallon or two of water.

Time to Plant.—The best time is late autumn or the beginning of winter, but the young trees must be well protected from frost. Planting may be continued until September or October, when there is not much danger of frost; but the tree would require very careful watering for the first summer.

Variety to Plant.—Washington Navel is the best, Mediterranean Sweet or Valencia are also recommended. The Lisbon is the best all-round variety of lemon.

Pruning.—The main thing is to make the trees a good shape and keep them open. Young trees need little or no pruning, but as they get older it may be necessary to cut out quite a lot of wood to allow sunlight to penetrate. This depends entirely on the growth the tree may make.

CITRUS RECIPES.

Lemon Jam.—Seven lemons, 6lbs. sugar, 13 cups water, juice of two lemons. Cut lemons as for marmalade, put in pan with water and boil two hours. Add sugar and boil a half hour or until it sets. Add juice of two lemons after it comes to boil second time.

Grape Fruit Marmalade.—Cut fruit finely, take out seeds. Allow 3 pints water to each 1lb. of fruit. Stand over night, boil for a half hour next day. Third day—weigh and add 1¼lbs. sugar to each 1lb. of fruit, and boil until it jellies.

Dessert: Orange Delight.—Five oranges 1 pint milk, 1 teacup sugar, 3 eggs, 1 tablespoon cornflour. Cut oranges (peeled) into thin slices. Sprinkle with some sugar. Heat the milk with some sugar, beat egg yolks, add cornflour, stir into milk and stand until cool. Pour over oranges. Beat egg whites and cover over top.

Orange Conserve.—One dozen navel oranges, score lightly into 12 or 16 pieces. Cover with water and add 1 teaspoon carb. soda. Cover with plate to keep fruit under the water. Stand for 3 days, then boil in fresh water until tender enough to probe with straw. Take out and cut fruit into slices. Make a syrup of 8 cups of juice and 16 cups of sugar, suing Brewer's crystals for preference. Boil 15 minutes, then put fruit in and cook until tender and syrup is thick.

Orange Jelly.—Cut up six oranges, cover with 6 quarts of water, stand over night. Boil until reduced to three-quarter quantity, then strain through muslin and then flannel. Add 1lb. sugar to each pint of juice. Boil rapidly a half hour or until it jellies.

HOME-MADE BREAD.

[Mrs. G. ORAM, Wilkawatt.]

Mention of bread-making sounds to many people like a drudgery, but if once mastered, it is a very great pleasure. It becomes quite fascinating when batches of beautifully browned loaves are taken out of the oven. Then there is the knowledge that they have not been packed in boxes and bags that are not just as clean as they should be. It is much cheaper to make your own bread. One bag (150lbs.) of flour at 25s. makes about 112 2lb. loaves, costing about 2¾d. per loaf. Bread from the bakeries is 6d. per loaf. Farmers having their own wheat gristed can save an extra ½d. per loaf. This calculation allows for freight of about 70 miles and wheat at 5s. per bushel.

Recipe for Yeast.—One medium sized potato, boiled and mashed. One small pinch of hops and one tablespoon sugar boiled together, then strained into potato mixture. Stand aside until luke warm. To yeast bottle, which should always have a little drop of yeast left in it, add one teaspoon plain flour and shake. Then pour in yeast and shake down. Do not fill bottle more than two-thirds full. Have a cork that is not too tight, and tie with loose string. This will allow cork to rise, the gas escape, and save you the worry of drawing the cork. Stand in warm place, not hot, until it works, and then remove to a cooler place, especially in summer, otherwise the yeast will become sour and be useless for making bread.

Bread.—Sift very lightly 4lbs. flour (2 large sifters full) into pan, add 1 handful sugar and one of salt. Mix with spoon. Then add a half cup of yeast. Mix with a spoon until all flour is mixed in, then sift in more flour and knead with hand, sifting in more flour as it is needed (nearly 2lbs. more). Dough must be of good even consistency, not too dry, not too wet. Always be sure to use plain flour. Cover pan with lid and put right inside a warm oven on a folded wheat bag.

In the morning this should be pushing the lid off. Grease 3 or 4 bread tins thoroughly. Sprinkle board lightly with flour and turn out the dough. Knead a few times, then cut into 3 or 4 pieces and knead into loaves. Put into warmed tins. Allow to rise 2 or 3 hours on the oven door. When well-risen, place in oven. In a few minutes make a moderate fire and bake for one hour. Be sure that the oven does not get too hot. Bread tins should not be washed, but wiped with a clean cloth. A pan with a close-fitting lid is best. It does not allow the dough to become dry on top, and it keeps in the gas from the yeast.

USES OF STALE BREAD IN THE FORM OF BREADCRUMBS.

[MRS. A. YOUNG, Wilkawatt.]

There are many tasty dishes, both savoury and sweet, which can be made with breadcrumbs as an ingredient. When making boiled puddings, the addition of breadcrumbs always makes them lighter. A lamb chop is nicer if fried in egg and breadcrumbs. By drying slices of bread in a warm oven and then rolling into crumbs, they can be stored in a screw-top jar for months, ever ready for a breakfast dish. Sometimes breadcrumbs are wanted when only new bread is available. Try sprinkling the pieces of fresh bread with a little flour before crumbling.

RECIPES.

Tomato Pie.—Serve with roast meat. Fill a greased pie-dish with layers of breadcrumbs, sliced onions, and sliced tomatoes. Season with pepper, salt, and a little sugar, ending with a layer of bread crumbs, dotted with small pieces of butter. Bake in moderate oven 1 hour.

Lemon Tart Filling.—Juice of two lemons and grated rind of one, 2 eggs, 1 cup each bread crumbs, cold water and sugar. Beat eggs and sugar, add juice and rind, then breadcrumbs and water. Bake in 2 sandwich tins lined with pastry, until set and brown.

Boiled Pudding.—One cup each breadcrumbs, plain flour, seeded raisins, finely chopped mutton suet, and sugar, two fresh apples (grated), 1 tablespoon marmalade, 1 teaspoon carb. soda, dissolved in sufficient milk to make a thick mixture. Boil three hours in a floured cloth which has been dipped in boiling water. Serve with thin custard or white sauce.

Maro Pudding.—In a pie dish have enough cooked sweetened apples as for a pie. Over this place a layer of breadcrumbs an inch thick. Place small pieces of butter on top. Bake until nicely brown.

Cocoanut Pudding.—One cup each grated cocoanut, stoned raisins, breadcrumbs and milk, 3 tablespoons sugar, 2 tablespoons melted butter, 1 egg. Beat well together. Bake in a buttered dish in a slow oven for 1 hour.

Kiss Pudding.—In a greased piedish put a layer of apricot jam ½in. deep. Cover with breadcrumbs 1in. thick. Make a custard with 1 egg, 2 dessertspoons sugar and ½ pint milk, pour over breadcrumbs. Bake until set, about ½ hour. Eaten cold or hot.

Chester Cake.—Filling: Soak stale bread, squeeze dry, beat until light with fork. Then add 1 packet of spice, 1 teaspoon baking powder, 1 cup currants, a piece of lemon peel, 1 cup sugar. Mix well. Paste: 1½ cups self-raising flour, ¼ cup dripping or butter, with enough water to make a light dough. Cut in two and roll out. Put filling on one and cover with other. Rub over with milk, sprinkle with cocoanut. Bake 1 hour. When cold, cut in squares.

Beef and Ham Polony.—1lb. each ham (raw) and steak, ½lb. breadcrumbs, mace, nutmeg, pepper and salt to taste. Mix and put through a sausage machine twice. Add 2 eggs. Roll well and tie tightly in a cloth and boil three hours. Glaze when cold on removal of cloth.

Mock Rabbit.—1½lbs. steak, 1 cup breadcrumbs, salt and pepper, thyme, 1 onion, sage, ½ cup milk, bacon. Grease piedish and into it put a layer of steak chopped finely. On this put layer of stuffing made with the crumbs, sage, thyme, salt, pepper and onion, mixed well together. Add another layer of steak then another of stuffing until dish is full. Pour half a cup of milk over this, chop some bacon and add that, sprinkle a little flour over the top and bake in a moderate oven.

Italian Sausages.—Two cups breadcrumbs, 1 hard boiled egg (chopped), 1 chopped onion, 2 teaspoons chopped parsley, little milk, 1 teacup boiled rice, 2ozs.

grated cheese, few herbs, pepper and salt, raw egg. Bind together with egg and milk, form into sausages, roll in egg and breadcrumbs; fry in hot fat.

Salmon Loaf.—Drain 2 cups salmon. Pour 1 cup medium white sauce slowly over two well-beaten eggs, stirring constantly. Combine with salmon. Add 1 tablespoon lemon juice, ¼ teaspoon salt, few grains pepper, 1 teaspoon Worcestershire sauce. Fold in 2 cups breadcrumbs. Grease small loaf pan, arrange peas or olives on bottom, put in half salmon mixture, arrange hard-cooked eggs end to end lengthwise of loaf. Cover with remaining salmon. Bake in moderate oven about 45 minutes.

Chicken and Ham Croquettes.—4ozs. chicken meat (cooked), 2ozs. boiled ham, 1 dessertspoon each butter and flour, ½ cup milk or stock, 1 hard-boiled egg, salt, cayenne, chopped parsley, few drops lemon juice, egg, breadcrumbs and butter. Method: Chop meat finely, melt butter, add flour, stir in milk; when boiling, add other ingredients. Cool on a plate, shape small quantities into croquettes on floured board, dip into beaten egg and breadcrumbs; fry a golden brown.

APRONS.

[Mrs. F. R. Koch, Wilkawatt.]

Many words are used and spoken without any thought of their origin and real meaning. I expect very few of us have ever looked in a dictionary for the word "apron." Though so simple a word, it is interesting to find it comes from the French "naperon"—a tablecloth. In old English it was "napron," but lost its initial "n" and became "apron"—"a cover for the wearer from injury or being soiled." Perhaps the word "pinafore" then comes to mind, explaining as it does to "pinbefore" one, an apron worn by children to protect the front of the dress. It is surprising how few patterns are ever given for aprons in fashion journals, making the quest for them more of a personal search among friends.

A thoughtful housewife will plan aprons of strong guaranteed dye materials, with flimsy ones for afternoon or party wear. How fashions have changed even in aprons! When the colonies were first being settled, the well-known German print variety held its own, heavily gathered into a narrow tight waist-band enveloping the whole of the skirt of the wearer. Then the black Italian cloth with square bib did service for many years. The alternative to these for high days and holidays was a huge white linen covering.

Suddenly colour came into the apron, being used as a trimming for the black, until finally the black was left out; and now what interesting types are worn! How wide can be the choice of materials and designs is shown in the display of aprons for all occasions. Apron making has become very fascinating with the use of several colours in one design. The shape has also altered from time to time. Following the very gathered style came an overall (now worn as a simple summer house frock with the addition of a belt to put shape into it), the back and front similar, and tied over the hips at sides. This had two faults—one in always catching on chairs, door-knobs, etc., the other in too much ironing.

The eagerness to find a protection for a dress with as little material in it as possible, means less ironing, and that is the chief point to consider when looking for a pattern, for less ironing in one apron means more often can a freshly laundered one be donned, and that spick-and-span appearance be kept regardless of dirty work. Keep certain aprons for certain work during the week, hanging them in a very inconspicuous corner. For serving a meal, a bright one, for separator washing, a bag one, cake making calls for a fresh one again, and so on. It must be much more pleasant to the eyes of those around the wearer when she appears colourful and clean on all occasions. If fond of bright colours, choose them to blend with a dress or room, and so have harmony rather than discord. For the very stout figure the use of gathers is better replaced by stitching down. They set better, and again it helps the ironer. If using a straight piece of material, fold it over double and cut away fully half an inch from the fold, decreasing towards the outer selvedge.

Mothers when bathing the baby, prefer to use a rubber apron; and soon the months go by and little pinny designs are sought for the toddlers. Then washing day calls for its own type, the rubber or bag apron being useful, with the addition of a peg bag in some very strong material. When gardening it is good to use a hessian or sugar bag apron, long enough to kneel upon. These can be very ornate and as colourful themselves as a garden in spring. A sewing apron is liked by some, but I prefer to have all my gadgets in front of me rather than in pockets upon my apron.

Do not forget the women of many foreign countries who beautify their own aprons with hand embroideries for aprons are not only used by the British but are internationally accepted as a covering for one's clothes. We are apt to think of aprons for females only, but let us think of such trades as carpenters, painters, and printers, who use the pockets for tools, etc.—butchers with their usual blue and white distinguishing type, or even the village blacksmith is not complete without his leather one.

CITIZENSHIP.

[Mrs. B. C. Pearce, Parilla.]

The dictionary meaning of the word "citizenship" is "the state of being a freeman, or enjoying political rights in a country." It is well for the women of our land to give a thought to the privileges they enjoy as citizens. The Australian women were granted the privilege of franchise long before the women of England, as they had not the need to fight for it they do not always regard it is a privilege. It seems a far cry now to the "shrieking sisterhood" we used to read about, and one wonders whether the rights so hardly gained are fully appreciated.

Women of Australia should think sometimes of the difference between our country and those which are governed by a dictator. We each have a vote, and we should use it wisely. We live in one of the most democratic countries in the world but we must not forget that we have had this privilege handed down to us.

Most of us take either a daily or a weekly paper, and if we care to, we can take a lively interest in the things that pertain to the Government of our country. In the State elections we are not compelled to exercise our vote. Perhaps that is not of very much account, if we do not know what we want in the form of Government, but we are missing an opportunity, and it is useless finding fault with Parliament, if we do not make any effort to let them see what we require of them.

It is not easy for a mother of a family to find time to study things pertaining to citizenship, but she has a wonderful opportunity of moulding thought in her family, if she takes the trouble.

It has been said that it is useless for women to have a vote as they only vote as their men-folk tell them. In some cases however, the women have had more opportunities of study than the men, and they can help the men to think.

There are many topics that more vitally affect women than men, and without taking the power out of the men's hands, they can let them see things from a different angle, and so help to bring about useful reforms. Women should take heart, and try to fit themselves to be a help to their country and to use intelligently their rights to citizenship.

Conference of Upper North Branches

At Booleroo Centre on 21st July there was an attendance of approximately 200. Mrs. Jettner, the President of Yandiah Branch, was in the Chair, and Miss V Keller acted as Secretary.

A paper on "Biscuits" by Mrs. Crisp, of Willowie, who presented a tray of many samples, was discussed to much length, and many ladies exchanged tested recipes. It was surprising the number of suggestions the ladies of these northern districts gave on the care and use of flowers. There were many questions asked, discussed and answered following the reading of a paper, "The Duties of Vegetables." The advantages or disadvantages of boiling vegetables were discussed by Miss E. Campbell of the Education Department.

On the resolution of Willowie, "That more space be set aside in the *Journal* for the reports of women's meetings, and that each Branch be granted more equal space," there was a very pressing demand for a larger representation in the *Journal.*

A chat on the formation of a Branch at Orroroo, which would enable the surrounding Branches to hold combined meetings, followed. A reply to the question of the propagation of Oleander was sent by Mr. Greaves from the Botanical Garden; An address on "Foods and the Methods of Cooking them," was given by Miss Campbell. Free questioning followed this address. Mrs. McCallum kindly read a paper on "First Aid" sent in by Mrs. Martin of Morchard. The advice that was given by a doctor to the Branch in a previous meeting was repeated by one of the members.

The following papers were read:—

Fish.

[Miss V. Roocke, Wepowie.]

Fish is a valuable article of food; less nutritious and less stimulating than meat as it contains so little fat. Some of the different kinds of fish are:—*White Fish*—Whiting, Rock Cod, Murray Cod, Pike, Flathead. *Oily Fish*—Mullet, Pilchards, Eels. *Shell Fish*—Oysters, Crayfish, Shrimps.

White fish have the fat or oil in the liver only; thus the flesh of the fish has a particularly white appearance. This class is most digestible. Oily fish have the oil or fat distributed through the flakes of the flesh, giving it a dark tint. This type is richer, but much less digestible.

Hints for Choosing Fish.—The flesh must feel firm to the touch; the gills must be red; the eyes must not be sunken, but should be bright; the scales must be all intact. The smell is not always a sure guide, for if the fish has been on ice, it may smell perfectly free from taint, but may taint immediately when taken into a warmer atmosphere. The skin should be smooth and moist. Never purchase a fish with the skin inclined to blister. Very large fish are risky, for they may be old; therefore they are liable to be tougher than smaller fish, so choose medium-sized ones.

Preparation of Fish.—To scale: Hold fish by the tail and scrape with knife from tail towards head. Rinse frequently to remove scales. Cut off fins with a pair of scissors. To clean: Make an incision from the vent to the gills. Remove the internal organs, wash carefully in cold water and wipe dry. To fillet: Place fish on board with head to the right hand. With a sharp knife cut through the flesh near the head to the backbone, then along the backbone to the tail. Turn and remove flesh from the other side. Take out any small bones which may have been left in the flesh. Now place fillet skin-side down on board. Hold the tail in one hand and slip the knife down between the skin and flesh, thus removing the skin in one piece. Soak fillets in cold water for 10 minutes. Dry thoroughly before using.

Frying.—Moisture causes hot fat to splutter and spoils colour and crispness, so have things fried as dry as possible. Foods placed in fat before it is at the right heat will be greasy and sodden; wait until a faint blue smoke rises before putting in the food. Nice hot fat seals the outside of the food at once, preventing the escape of juices or the fat soaking into the food. Cover the fish completely, whether it is with flour, batter or eggs and crumbs. Cooking must be done slowly so the centre will cook. Fish and rissoles are better cooked in a frying basket. It is quite possible to do without, but you must be careful that they are well covered with batter. If necessary, do it twice. Then lower them one at a time into the fat. Fry about four at a time, and then reheat fat and serve garnished with lemon and parsley.

Suggestions for Arranging and Prolonging Lives of Cut Flowers.

[Mrs. Ware, Wepowie.]

No home has achieved its best until flowers have their rightful place in it. Flowers can add the final lovely accent to the colour scheme. Some people have an instinctive flair for producing interesting and charming floral arrangements. However, given a natural love for flowers, anyone can soon learn how to obtain satisfying results if a few simple rules are learned; speed comes with practice.

True lovers of flowers are for ever experimenting with colour and trying new ways of grouping, and more often than not the results are enchanting. For instance, a large meat dish can be used for skilfully arranging short-stemmed simple garden blooms. Some examples of flowers which look well arranged thus are Petunias, Phlox, Begonias, Forget-me-nots, Autumn Leaves with Fuchsias, Violets on their leaves, or Nasturtiums with their bright circular leaves. A judicious combination of flowers makes for interest and avoids monotony, but, in all cases, a single kind of flower should predominate.

The scope of arrangement is endless, the effect always charming, if taste is used in choosing suitable flowers for each arrangement. For instance, pieces of shrubs with green leaves and coloured berries or pods placed in wet sand in an oblong box make a bright suggestion for a daytime screen for the fireplace, whereas Dahlias would be out of place. Then, again, imagine deep, rich-red Cactus Dahlias as a central decoration on a formal dinner table—their dignified beauty accentuated with shining silver and glass on a polished mahogany table, and tall, tapering red candles in flat silver holders shedding a soft light o'er the scene. Marigolds, Nasturtiums, Gaillardias, and the like would be out of place here, and yet they would be happily at home on the breakfast table.

To Prolong Lives of Flowers.

Flowers should be cut during the coolest hours of the day, when the tissue is filled with moisture—early morning or late afternoon. They should be cut with a sharp knife. If the cut is slanting, the water-absorbing surface is increased considerably, particularly when the stems are thick and heavy. Another advantage is that a slanting cut prevents the cut surface from resting squarely on the bottom of the vase or bowl and clogging the tubes through which the water is drawn into the stem. In any case, the stem should never rest on the bottom of the receptacle.

Do not arrange flowers immediately upon gathering them; they are likely to wither quickly. Rather, after cutting, plunge the stems in a deep receptacle, water filled, but do not submerge the blooms, and leave in a cool place for a few hours. Flowers which have been thus "cooled" are more easily and quickly arranged, for the stiffened stems permit the placing of each flower in the definite position it is to occupy in the floral scheme. The lower leaves should be removed, for not only do they choke up the vase and make arrangement more difficult, but they become slimy and unpleasant in a very short time. Flowers that have wilted after a journey may be freshened by plunging the stems into boiling water and leaving them until the water is cool. Then cut off the ends of the stalks and put into cold water to properly revive. It is also claimed that a small piece of charcoal in the bottom of the vase will prolong the keeping qualities of flowers. Another idea is to stir a teaspoon of saltpetre or of carbonate of soda into the water in which the flowers stand each time the water is changed. Anemones and Ranunculi last much longer if placed in a bowl of wet sand.

Cut Flowers.

[Mrs. A. H. Keller, Yandiah.]

Early morning, while the air is fresh and cool and the flowers are laden with dew, is the best time for cutting flowers, as the plant absorbs moisture all night long. A sharp knife, using a slanting upward cut, makes a clean cut without injuring the stem. If the stem, which acts as a tube to supply water to the leaves and blossoms, is crushed, the needed supply is unable to ascend and the flower soon withers. Hardy wood stems may be cut with sharp shears.

Ordinary scissors should not be used for cutting. The slanting cut opens a larger surface to the water and prevents the cut surface from resting flat on the bottom of the vase, thereby impeding the absorption of water. Woody stems should be split two ways for about 1in. or the bark scraped or lacerated. As soon as the flower stem is cut and exposed to the air, a certain amount of air is absorbed, which later impedes the fullest influx of water. If the cutting is done under water, the new tissue will absorb water rather than air. A good suggestion is to carry a bucket of water to the garden, and, when cut, the flowers are immediately plunged into it to the full length of their stems. Thus, they have no chance to start wilting. Then stand the pail in a cool, dark place for 2 to 3 hours; 6 to 12 hours is not too long, as it allows them to drink themselves completely full of water.

Flowers need fresh air and should be moved out of a room while sweeping and dusting. They should not be in a draught, as it induces evaporation faster than the stems can supply moisture. Some of the foliage should be removed to cut down evaporation; also, that which would be below the water, as it will decay and pollute the water. If all the leaves are removed from Poinsettias they may be kept much longer. The best authorities agree that flowers should have fresh water daily, and the stems should be freshly cut, as some stalks seal themselves in the same way that the edges of a wound draw together. Some florists add 5 to 20 drops of formaldehyde, depending on the size of the vase, to the water in which they first put the flowers and let them stand before arranging them. For flowers in full bloom,. 5 grains of aspirin to a gallon of water has been found successful by many. If bought flowers do not look very fresh, cut off the ends of the stalks and dip the latter into hot (not boiling) water for 10 minutes. The flowers are then put into carbonated water, which is made by putting a pinch of carb. soda into water and stirring. It is also claimed that if a few drops of camphor are added to the water it aids flowers to absorb water more rapidly. A piece of charcoal added will help to keep the water sweet. If post-sent flowers have the stalks inserted in small pieces of potato, they will arrive in a fresh state.

Many flowers, especially Poppies, will stay fresh longer if their stems are sealed by plunging them into boiling water, or by scorching the ends. Having cut the flowers, do not just gather them up and push them tightly into a bowl. A major fault is overcrowding. The Japanese use flowers very sparingly—just a few blossoms or sprays loosely arranged, so that each may be seen. They choose stems which bear leaves, flowers and buds, and after arrangement in the vase, every surplus leaf or bud which prevents every part of another being seen is snipped off with scissors.

Another of their rules is that the length of the stalk shall not be greater than one and one-half times the height of the vase. An odd number of flowers is more pleasing that an even number. Green foliage combines with most blooms, and some white flowers, especially the lacy ones, look nice with highly coloured ones. Vases as a rule should harmonise with the flowers, although some contrasts are quite good. Clear glass is always a safe selection. Wild flowers look best in plain earthenware jars.

Always try and pick up in the flowers the colour of something in the room. Often the predominant hue in a vase of blooms will match the curtains or the design of the carpet and, with a little thought, it may be so placed as to accentuate the best-liked tones of the room's furnishings.

Keeping and Feeding Caged Birds.

[Mrs. H. R. Neale, Yandiah.]

Bird keeping as a hobby need not be a very expensive one and need not necessarily take up a great deal of time. Aviaries and cages can be made by many people with a little carpentering sense, and the drinking vessels and nests cost very little. To be successful, the work must be done under hygienic conditions. A simple cage can be made from a kerosene box. First remove the lid and one side carefully; these boards can be used to make a gable roof. The wire front with a door can be purchased from any bird shop. When this is completed, be sure and put in some perches.

Brushing out the whole cage with kerosene is a good plan for fumigation. Have movable trays so that the bottom of the cage can be kept clean, and also provide fine sand and shell grit. Give a few thistles daily, especially to canaries. If building an aviary, be careful to have a place sheltered from southerly or northerly winds, for preference so that the birds get plenty of sun; 8t. x 4ft. is the usual size for an aviary, about 6ft. being for flying, with the rest boarded up for nesting purposes. Use ½in. mesh netting and for the floor have concrete or grass. A bird bath is also an attraction. Have a gabled roof to allow rain to run off. Always keep food and water fresh, and constantly clean out the utensils to have healthy birds.

The health of the birds depends largely on their food. They should have good seed and shell grit for bone building. Pieces of cuttlefish are to be found on most beaches and are very beneficial. Give canaries canary seed mixed with a little hemp and also milk thistle, water cress or lettuce, but do not let the stale pieces lie about in the cage. The food for canaries can also be used for finches and other small birds. To keep the cages free from vermin, clean them once a week, and should they be attacked by vermin, essence of quassia in the bath water is a big help.

The Duties of Vegetables.

[MRS. C. SCHULZ, Morchard.]

Every vegetable has its own particular duty to the individual from a medicinal point of view, and vegetables should therefore be taken freely and in variety.

Onions are excellent both as food and medicine. They will help the digestion and purify the blood. Eaten boiled at night, they will cure a cold and induce sleep, so that nervous and restless people should include them in their diet.

Celery is splendid for those people who suffer from rheumatism. When boiled, the water should be put in soups and stews. A little raw celery eaten after heavy meals helps digestion.

Water cress should be eaten in spring. It is a tonic and blood purifier, but it should be well masticated.

Spinach, asparagus, parsley and beans have a good effect on the kidneys and help in the curing of all kidney troubles.

Tomatoes are good for the blood and all affections of the liver.

Potatoes are a staple food. They are very nourishing, especially for thin people. Stout people, however, should eat sparingly of them and make up their loss with other non-fattening vegetables.

Lettuce, spring onions and cucumber are good for cooling the blood. Those who cannot take them raw should have them boiled like spinach.

Carrots, turnips and parsnips are useful foods. Carrots clear the skin from blemishes.

Cabbage, curly greens and sprouts should always be taken freely. The juices of them are necessary for the blood, and their use cures and prevents scurvy and other skin diseases.

Beetroot nourishes the blood and should be eaten by the anaemic.

Parsnips boiled are very good for lumbago and similar complaints.

The juice of tomatoes is a perfect softener and whitener for the skin. It is especially valuable after sun bathing if it is rubbed daily into the shoulders, arms and hands.

How to Treat Cuts by First Aid Methods.

[MRS. W. MARTIN, Morchard.]

The most serious thing when one has cut oneself is the bleeding. Slight cuts are very unpleasant, but not dangerous. The important points in treatment are to apply adequate pressure and to keep the cut clean to prevent it becoming septic. The first thing to do is to clean the wound with some mild antiseptic. Hydrogen peroxide is very good for the purpose. Iodine is also most efficient, though stinging in open cuts. Always clean out cuts thoroughly with warm water (if it is available). Great care should be taken, particularly if a wound was received in the garden, stables, or where manure is being used; germs of tetanus live in and around stables. Should the cut be deep, place a pad on the wound and bandage very firmly. Supporting the hand or arm in a sling is very comforting; the rest aids healing and helps to relieve the pain.

Severe cuts are those in which big blood vessels have been severed. First aid measures must be quick as the loss of blood is often great, then a doctor's help must be sought. If arteries are cut, the bleeding comes in spurts with the pulse beat and the blood is bright red. If a vein is cut, the flow is steadier and of a darker hue. It is most important to be able to distinguish these two types of bleeding, as their treatments are very different.

Blood flows along an artery away from the heart to the extremities—the feet, fingers, toes, &c. Therefore to stop bleeding, pressure must be applied on the limb between the cut and the heart. This pressure should be on the main artery itself if it can be found. In the arm, the main artery runs down the inner side from shoulder to elbow, where it can be felt, and it comes to the surface again at the wrist, on the thumb side, in front. For severe bleeding of hand or wrist, pressure must be applied on one of these places between the cut and the shoulder. The main artery on the leg runs down just to the inner side of the thigh, nearer to front than back of legs, and pressure must be applied for bad cuts, similarly, for leg or foot.

For bleeding from veins, all that is necessary is to raise the limb above the level of the heart and put direct pressure on the spot itself. Such bleeding is often alarming, but is easily stopped. Remember, in trying to stop the bleeding, keep calm, cool and decide what to do and do it quickly. Do not get "panicky."

Biscuits.

[Mrs. A. Crisp, Willowie.]

Biscuit making should be very interesting, as there are so many recipes and such a veriety of colourings and flavouring essences available that it is possible to suit all tastes. It is tiring work and somewhat tedious, so that it is a good plan to arrange to have a free morning or afternoon for the baking. Then, one can make a fair supply to last several weeks.

Biscuits of a good quality do not deteriorate when stored in good, airtight tins. Where there are children, one must have several assorted biscuit tins in the cupboard. Biscuits are ideal and quickly served with a hurried cup of tea. Then, again, biscuits are good to go to the paddock during harvest time.

If packed in a separate tin, the heat does not affect or spoil them as it does cake. In many biscuit recipes the butter is rubbed into the flour and the eggs well beaten with the sugar, then mixed into a dough of a firm consistency, rolled thin and cut into shape. When using the biscuit forcers, some prefer to cream the materials. A moderately quick oven is needed for baking, with clean shelves; grease them with dripping—butter creates moisture. When biscuits are baked, lift on to trays, lay flat until first heat escapes. Wash bowls, beaters and spoons for every fresh mixture. Flavoured icings improve plain biscuits, while rich biscuits are nice with a sharp tasty jam put between or on top, then dipped in cocoanut. Biscuits can be made very attractive by different icings and fillings, and by having a number of fancy cutters. This biscuit mixture will make a variety of biscuits by adding different essence icings and fillings to taste:—1lb. flour, 1 teaspoon baking powder, ½lb. butter, ¼lb. sugar, 2 eggs. A number of recipes were supplied by Mrs. Crisp.

Eyre's Peninsula (West) Conference

The Conference and Exhibition sponsored by the Maltee Women's Branch at Ceduna on 7th July attracted a large attendance of members of branches from Maltee, Mudamuckla, Murraminga, Laura Bay, and O'Loughlin.

Miss R. Talbot presided at the Conference, when the following papers were submitted:—"Household Economies and Hints" by Mrs. Riencke (Maltee), "Knitting" by Miss T. Barnett (Laura Bay), "Cooking the Rabbit" by Mrs. Burke (Laura Bay), "Carrots and Their Uses" by Miss S. Schwarz, and "The Fascination of Home Decoration" by Mr. S. T. Gooden.

Short addresses on Bureau work were given by the Chairman of the Advisory Board of Agriculture (Hon. A. L. McEwin, M.L.C.) and the General Secretary (Mr. H. C. Pritchard.)

The Exhibition resulted in numerous entries, and most favourable comments were made on the quality of the exhibits and the very fine display which was presented by the whole of the exhibition. The staging was arranged effectively, and the Secretary (Miss L. Schwarz) was complimented on the work she had carried out on behalf of her Branch, both in regard to the Conference and Exhibition.

Competitors who gained first prizes were as follows:—

COOKING.

Brown bread, Mrs. Noske; white bread, Mrs. A. Kloeden; yeast buns, Mrs. S. Trewartha; scones, Mrs. J. Schwarz; home-made biscuits, Miss L. Blumson; sponge roll, Miss L. Blumson; jam tarts, Miss R. Blumson; pasties, Miss R. Blumson; ribbon cake (iced), Miss L. Blumson; coffee cake, Miss L. Blumson; pound cake, Miss L. Blumson; cream puffs, Miss T. Kies; sponge cake, Miss T. Kies; butter sponge, Miss N. Schwarz; German cake, Mrs. E. R. Pfeiffer; Madeira cake, Miss L. Blumson; ginger cake, Miss L. Blumson; Checker sponge roll, Miss L. Blumson; sultana cake (to be made by member of Men's Branches), Mr. W. Bowell; 1 loaf of bread (to be made by a man), Mr. L. Martin. Miss L. Blumson obtained first prize for most entries in cooking—totalling 18.

PICKLES, SAUCES, JAMS, AND VARIOUS.

Pickled onions, Mrs. A. Kloeden; mustard pickles, Miss L. Blumson; vinegar pickles, Miss L. Blumson; tomato chutney, Mr. W. Bowell; Worcestershire sauce, Mrs. A. Kloeden; tomato sauce, Mrs. F. Edson; mock ginger, Mrs. R. Lowe; quince jam, Miss L. Blumson; melon jam, Miss L. Blumson; orange marmalade, Miss R. Blumson; tomato jam, Mrs. W. Bowell; plum jam, Mrs. F. Edson; dried apricot jam, Mrs. W. Bowell; home-made soap, Miss L. Schwarz; toilet soap, Miss L. Schwarz; dairy butter, Miss L. Blumson; hen's eggs, Mrs. S. Trewartha; lard, Mrs. T. Schwarz; scalded cream, Mrs. E. Lowe. Miss L. Blumson gained highest points in this section—totalling 34 points.

FANCY WORK.

Traycloth, Miss L. Blumson; guest towel, Miss R. Blumson; traced bed-jacket, Mrs. J. M. Blumson; worked pillow sham, Miss R. Talbot; table centre (any work) Miss V. Kloeden; crochet d'oyley, Miss M. Kies; vanity set, Miss R. Talbot; worked d'oyley, Miss R. Talbot; worked apron, Miss R. Blumson; plain handsewn garment, Mrs. Burke; house frock by amateur (machine sewn), Miss A. Bassham.

Fancy Work for Girls under 14 Years.

D'oyley, Mary Blumson; handsewn garment, U. Kloeden. U. Kloeden gained highest points for girls under 14 years—totalling 5.

KNITTING.

Bedroom slippers, knitted or crocheted, Miss. D. Blumson; child's cardigan, Miss D. Blumson; baby's set (coat, bonnet and booties), Mrs. L. Martin; man's knitted socks, Mrs. Riencke; lady's knitted bed jacket, Miss S. Schwarz; knitted tea-cosy, Miss D. Blumson. Miss D. Blumson gained highest points in knitting—totalling 9.

HANDICRAFTS.

Article out of sugar bag (natural), Mrs. Bourke; article out of sugar bag (dyed), Miss D. Blumson; article out of rag or patch bag, Miss S. Schwarz; hooked rug, Miss K. Flaherty; most attractive frock hanger, Mrs. J. Foggo; hand-made slippers (not knitted or crocheted), Mrs. J. Foggo; article from crepe paper, Miss L. Schwarz; peram or cot cover, Mrs. Noske; best article not to exceed 2s., Mrs. Burke. Mrs. Burke gained highest points in handicrafts—totalling 9 points.

FLOWERS.

Three carnations, Mrs. Noske; 3 ivy geraniums, Mrs. E. Lowe; 3 double geraniums, Miss R. Schwarz; 3 single geraniums, Mrs. Noske; 3 marigolds, Mrs. E. Lowe; 3 double stocks, Mrs. R. Lowe; posy buttonhole, Mrs. J. Blumson; 1 bowl chrysanthemums, Mrs. E. Lowe; 1 bowl cut flowers (variety), Mrs. J. Blumson. Mrs. E. Lowe gained highest points for flowers—totalling 17.

VEGETABLES.

One piemelon, Miss A. Edson; 1 bunch carrots, Mrs. S. Trewartha; 1 bunch red beet, Mrs. Kuhlmann; 1 bunch radishes, Mrs. J. Schwarz; 1 bunch turnips, Mrs. R. Lowe; 1 bunch rhubarb, Mrs. J. Schwarz; 1 head lettuce, Mrs. Noske; 1 head cabbage, Mrs. Kuhlmann; 1 head cauliflower, Mrs. Kuhlmann. Mrs. Kuhlmann gained highest points in vegetables—totalling 10.

Knitting.

[Miss T. BENNETT, Laura Bay (Ceduna Conference).]

Knitting is a pleasing and most useful pastime. As winter draws nearer our thoughts turn to something warmer to wear. What could be better than hand knitted garments? There are numerous garments one can knit, such as jumpers, cardigans, "undies," &c. All these cost very little to make, and are twice as nice as ready-made articles.

Before starting a garment, be sure you have enough wool to finish it. If knitted articles have to be washed frequently, such as socks and children's wear, it is advisable to shrink the wool before using it. To do this, put the skeins of wool into a bowl of clean warm water, and let it stand for several minutes. Then squeeze out the wool with the hands and lie it on a towel to dry. When dry, wind in the usual way. Another way in which to shrink wool is to put the wool into cold water and stand it on the fire until it comes to the boil. When boiling, lift out the wool and dry it.

When knitting bands for jumpers, &c., if you knit into the back of stitches it will prevent the bands from stretching, as is often the case when two or three-ply wool is used. This can also be done all through the knitting, if knitted in a plain stitch.

Often it is hard to get the neck bands to set nicely. The easiest way is to knit the bands separately. To arrive at the right number of stitches to cast on for a band, measure around the neck, then find how many stitches make an inch and cast on accordingly. For example, if the measurement around a neck is 10in., with seven stitches to the inch, multiply the two together and you have the correct number of stitches.

To prevent joining wool in the centre of the work, start the row with a new skein of wool. To make up a garment, it is usual to crochet it together, but if it is not for show work, machine it together, as it is stronger. It is advisable to buy cheap wool for socks and children's wear; it wears longer and launders better.

Cooking the Rabbit.

[Mrs. W. Burke, Laura Bay (Ceduna Conference).]

At the very mention of rabbit quite a number of people look dubious, while others refuse the idea of eating it altogether; but if cooked tastily, rabbit is delicious and resembles the fowl in flavour. The smell of plain boiled rabbit has something distinctly distasteful about it, and no doubt that is why so many people do not care for the meat. Rabbit meat needs blending with the right flavourings and seasonings, and time taken over the preparations. The results should please the most fastidious palates.

Rabbit is best killed just before it is full grown; the older they are the stronger is the "gamey" flavour.

To Prepare.—Soak the cleaned and skinned carcase over night, or for several hours at least, in salt and water, to help rid it of that "gamey" flavour. Another way is to hang it for 24 hours and then soak it for half an hour or so in salt and water before cooking. If you joint it, it is a good plan to remove the bone about 2½in. long that lies on the top of each hind leg where it joins the backbone. Around this bone is the strongest of that "gamey" taste. After rinsing and drying, the meat is ready to cook.

Recipes.

Brown Stew.—Soak and joint a rabbit, and roll the pieces in flour. Fry them until brown in a heaped tablespoon of good dripping, and put aside to drain. Slice one or two onions thinly and fry these also until brown.

Sprinkle in one tablespoon of flour, stir till smooth and brown, and then gradually pour 1½ pints of water and stir until a good gravy is made. Pour all the above into a saucepan, add pepper and salt to taste, two or three bacon bones, and any root vegetables you have. Simmer gently for 1½ hours until meat is tender.

Rabbit Pie.—Steam a rabbit in a little water, together with a bacon bone and onion, and then remove flesh from bones. Have ready two hard-boiled eggs, two slices of bacon and one teaspoon of chopped parsley. Cut the rabbit flesh in neat pieces, also the bacon and eggs. Arrange in a piedish in layers, sprinkling each with pepper, salt and parsley. Pour over a little of the liquid in which the rabbit was boiled; then cover with a good short crust and bake in a hot oven for 30 minutes. Serve hot or cold.

Roman Pie.—Cook a rabbit as men-mentioned in the above recipe, and remove meat from bones. Cut it finely and mix with one large cup of cooked macaroni or rice, one or two tablespoons of grated cheese, a small onion chopped finely, a large cup of milk, and salt and pepper to taste. Put the mixture in a pie dish, cover with breadcrumbs and dabs of butter; bake 30 minutes in a moderate oven.

To Roast a Rabbit.—Mix a good seasoning of breadcrumbs, herbs, a dessertspoon of good dripping, salt, pepper, and a chopped onion. Stuff the rabbit, roll it in flour and cook in a covered roasting dish if possible. If you have not a covered dish, use several thicknesses of brown paper to cover. Baste often.

Rabbit Relish.—Joint a nice young rabbit and lay the meat in a dish. Cut up four slices of bacon into squares with three medium-sized onions. Add a little chopped parsley, a little salt and pepper, and place on top. Cover with milk. Then put on top about ½in. thickness of breadcrumbs with dabs of butter and cook slowly for 1½ hours.

Potted Rabbit.—Put a rabbit in a jug with ½lb. bacon and steam three hours. Take out of gravy and mince. Put back in gravy and add ¼lb. butter or dripping, one teaspoon of Worcestershire sauce quarter teaspoon cayenne and salt to taste. Add a little nutmeg. Stir and steam again for about 15 minutes. Put in small jars with melted fat over it. Delicious for sandwiches.

Household Economies and Hints.

[Mrs. Reincke, Mudamuckla (Ceduna Conference).]

The Mending Basket.—When a pair of men's trousers wears thin on the knees, cut off both legs as high up as possible and exchange legs. Place the inside seams together and that will bring what was the thin portion on the knees to the back of the leg, where there is practically no wear, and the strong part will be in front. The same method applies to shirt and jumper sleeves when the elbow wears thin; also plain pillow slips—unpick the bottom seam, place the outside corners to the centre and sew up again. By so doing the worn part is at the sides, with the strength where the head comes.

When knitting socks or stockings, knitting brilliant in heel and toe will double the life of them.

Save old socks, woollens, &c., join all together and cover with cheap cretonne, making a very warm rug.

When remaking old garments for the toddler, be sure to patch all weak places before sewing up. This saves time when it comes to mending. When the hole appears the patch is there to darn down on.

Almost any kind of break in glassware, earthenware, or crockery can be mended with ordinary paint. White paint is the best, although coloured can be used with good results. Do not stir the paint, but dip right down to the bottom of the tin and get the putty-like mixture that settles on the bottom. Have the article to be mended free from dust and smear a little paint on each surface by means of a small stick or match. Place or tie firmly together and put aside to set. It usually takes at least a fortnight. Articles mended with paint seldom break in the same place again. Lamp glasses and brown earthenware tea pot lids mended in this way have stood the test well.

A very good tennis shoe cleaner is made by taking ordinary cold boiled starch and mixing whiting to make a paste of the right constituency to apply to shoes. Add a little washing blue. When well mixed let stand a few hours before applying. If it thickens while standing, thin down with cold water.

A cheap washing solution is made by mixing in an earthenware or enamel jar or dish 1lb. of lime and 1lb. of washing soda and 1gall. of cold water. Let it stand for three days, stirring occasionally. On the fourth day bottle and add one cupful to each copperful of water. Also add a little to the tubs when you soak the clothes. It is also good in the wash-up water for dishes and separator.

When your tea towels, pillow cases, &c., become thin and show signs of wear, put them through weak starch. It lengthens their life, makes them easier to iron and wash, because as the starch loosens so does the dirt. Add one teaspoon of salt to starch on windy days and starch will not blow out of garments.

A very good kitchen cleanser is made by sifting wood ashes finely and adding equal quantities of whiting and soap powder.

When cleaning stoves with blacklead, first dissolve the blacklead in cloudy ammonia, then add cold tea or vinegar and the stove will double its shine.

Ordinary milk will soften hard water, and one can blue clothes quite well if a cupful is added to the blue water, even if Tod River water is used for washing.

When the enamel is chipped off a large jug or dipper and it then rusts into big holes, these can be mended successfully by mixing cement with water into a running paste. Pour this into the jug or dipper to form a false bottom; leave to set and dry, and it will be ready for use.

When making tea, add one teaspoon of sugar to the pot. It improves the flavour, and if by accident tea is spilt on the tablecloth, it comes out very easily when washed.

To Clean Dark Clothing.—Take one knob of blue, two tablespoons of cloudy ammonia, and two quarts of rainwater. Dissolve the blue in water, add ammonia, and take out one pint. Clean and brush article well, then let dry. Take an old piece of fuji silk, wring out of the pint, and press clothes under same. They will look like new, and it takes all the shine from them.

A very good lotion for rough chapped hands is made by mixing equal parts—about a tablespoon of each—of glycerine, peroxide, methylated spirits, Friar's balsam, lemon juice and water. Wash the hands in warm water and apply the lotion. As one application dries, rub in another. Repeat this several times if the hands are badly chapped.

After peeling onions, wash hands and knife in cold water immediately; it takes away all onion smell. If when peeling onions for pickles you "can't help but shed a tear," have near at hand some bread cut into small pieces and keep a piece in the mouth. It will prevent this annoying trouble.

When putting new ticking on mattress or pillows, wash the old ticking and put it on over the new. As time goes on one has only to take off the old ticking and wash it as one would a pillow case and the new one is quite unsoiled.

Always place an old blanket between sheet and mattress. This not only gives extra warmth during the winter, but it also gives longer life to the sheets.

When storing blankets, woollens, &c., saturate pieces of cotton wool with turpentine and put them amongst the woollens. This is much more effective than camphor for keeping moths away.

When making butter, just before pounding work in about half teaspoon sugar to each pound. It improves the flavour and the butter keeps much longer.

If the milk is heated before adding to eggs when making a baked custard, it will set much more quickly, cook more evenly, and the whey will not come out if slightly over-cooked.

Kerosene is a disinfectant, and when used on cuts, &c., it will arrest bleeding, even in severe cases. Hold the foot or hand in a basin of kerosene; it has wonderful cleansing and healing powers. When a cut is treated with kerosene, it heals quickly and is less sore than when otherwise treated.

Cold weak tea is a good eye lotion. If the eyes are very inflamed and sore, apply a cold tea-leaf poultice over-night.

A reliable cough medicine for small children is made by mixing equal quantities of lemon juice, honey, glycerine, and olive oil. Give in teaspoonful doses if cough is troublesome.

Strong, hot, salt water will check gathered fingers or whitlows if used early enough. The affected joint is held in the water several times daily.

Several cloves in a cup of tea without milk will relieve a nervous headache, or with a squeeze of lemon juice for a bilious headache.

Carrots and their Uses.

[Miss S. Schwarz, Maltee (Ceduna Conference).]

Carrots have a great advantage over many other vegetables, as they can be obtained all the year round. They are easy to grow and can be used by every member of the family, from the tiny baby to the grandparents. In California the value of the carrot crop last year was £1,000,000, and 15,700 acres of this vegetable were grown.

When preparing them, wash well, but do not scrape; a soft nail brush is best kept for this.

To extract the juice from carrots, grate and then squeeze through a muslin bag, or they can be put through a meat mincer with a basin underneath to catch the juice. A teaspoonful of juice per day may be given to children from a couple of months old. Those who have this daily have a stronger digestion and better all round health. It is one of the best preventives of common ailments.

In Los Angeles and Hollywood carrot and celery juices are delivered in bottles in the same way as milk, and business men are drinking these health-sustaining juices in place of their usual morning and afternoon tea and coffee. It will not be long before these juices are sold here as freely as milk in our city shops, for Australians are as keenly food and health conscious as their cousins over the sea.

Grated carrot taken every morning before breakfast is a good complexion beautifier. It also improves the hair, giving it quite a glossy appearance. A healthy salad may be made with grated carrot to which is added a little salt cream and lemon juice.

To Bake Carrots.—Wash about 12 medium-sized carrots, but do not scrape or cut. Dry thoroughly and put on shelf in oven or put into a paper bag. Bake until soft—about ¾ to 1 hour. When done, the outside skin is shrivelled and dark, but the inside is soft and juicy. Carrots, beets, onions, parsnips, as well as potatoes, are delicious baked this way, although beets are best baked in a dish with a lid to hold the juice. No dishes are needed and no fat or water; it is both economical and healthful.

Carrots also add to the nourishment and flavour of soups and stews, and grated carrot in steamed puddings, as well as jam, is also very nice. When eggs are a scarcity carrot is a very good substitute; one small grated carrot equals two eggs.

Grated carrot and a little onion (if liked) make good sandwiches for school children. For a poultice, use freshly cooked carrots without salt; mash, and while still warm place on the wound. Change every six to eight hours.

Although often looked down upon, the carrot contains a large amount of mineral elements which counteract body acids and poisons. Carrot also possesses certain antiseptic properties which remove impurities from the system.

To grow this vegetable, a fairly rich soil is needed. A bed where tomatoes or cabbages have been grown suits them well; no fresh manure should be added. If sown in July or August they do not go to seed, and you have carrots all the year round.

Improved Times for Children.

[Mrs. E. P. Wall, Eurelia.]

We may look upon children at present as having what our American cousins would call a "good time." Publishers of children's books are producing stories illustrated in a manner which was undreamt of when we were young. Children's magazines now supply literature suited to all classes of youthful readers, while baby can rapturously attempt to tear the linen pages of his beautiful picture book.

Were there ever such cheap and attractive toys as are now displayed to the admiring gaze of our little ones as they pass along the street? Articles which parents in younger days sighed after in vain as being so expensive now appear commonly in our homes. Mechanical toys, if really good, are perhaps one of the best, for they both give pleasure to children and afford them the opportunity of asking "How is it done"? Children's toys were never brought to such perfection as now. Dolls have as many changes of attire as princesses. Dolls' houses have all the latest improvements, for must not dolly keep up with the times? Only we wonder that the snub-nosed and hideous idols of our childhood do not rise from the ash heap and lumber room to ask why they were so ill-treated.

The most elaborate amusements are now provided for the young ones. New games are plentiful—healthy outdoor ones and amusing indoor ones. The rising generation has much upon which it can congratulate itself, and we hope they see the wisdom of endeavouring to profit by the improved times in which they live.

BUTTERMILK AND ITS USES.

[Mrs. R. H. Byerlee, Parilla Well.]

Buttermilk is very valuable in the kitchen. It can be used for various things such as cakes, buns, and scones, in an economical way. Buttermilk contains an acid which cuts the amount of cream of tartar in halves, as is usually used with ordinary milk, *i.e.*, by using a half teaspoon of cream of tartar to the same amount of carb. soda with 2 cups of flour, it will give quite as satisfactory results as the proportion of 1 teaspoon cream of tartar to ½ teaspoon of carb. of soda with 2 cups of flour when used with cow's milk. The amount of eggs is reduced and in some recipes omitted altogether. It also reduces the amount of butter, therefore, giving wholesome and palatable food at a lower cost. Buttermilk is also very good for the skin, it helps to keep it soft and removes stains.

RECIPES.

Chocolate Cake.—Ingredients: 1 tablespoon butter, 1 cup sugar, ¼ teaspoon salt, 1 cup buttermilk, 1 teaspoon carb. soda, 1½ cups plain flour, 2 tablespoons (scant) of cocoa. Method.—Cream butter and sugar to a cream, add salt, dissolve in buttermilk Add flour and cocoa sifted together. Bake in moderate oven. This may be used as a layer cake, or add fruit and use it as a block cake.

Buttermilk Fruit Cake.—Ingredients: 1 cup of dripping and buttermilk, ¾ cup sugar, 3 cups flour, 2 teaspoons baking powder, ½ teaspoon carb. soda, ¾ teaspoons mixed spice, currants, and raisins, ¾ cup treacle. Method.—Cream dripping and sugar, add buttermilk with soda dissolved, add treacle, and then fruit. Add dry ingredients sifted, and bake 2 hours.

Buttermilk Buns.—Ingredients: 1lb. flour, 1 teaspoon each cream of tartar, carb. soda, pinch of salt, 6ozs. butter, 4ozs. sultanas and chopped dates, 2ozs. each chopped peel and chopped nuts, 1 cup sugar, 2 eggs, buttermilk to mix few drops vanilla. Method.—Mix in order given, drop in spoonsful on greased tray and bake 10 to 15 minutes in hot oven.

Sultana Loaf.—2½ cups plain flour, sifted with 1 teaspoon carb. soda, and 2 teaspoons cinnamon, ¾ cup sugar, 1 cup each sultanas and buttermilk, and lastly add 1 large tablespoon butter (melted). Bake 1 hour in bread tin. Cut in slices and spread with butter.

Buttermilk Scones.—2 cups flour, sifted with ½ teaspoon cream of tartar, a good pinch each of salt and sugar, and ½ teaspoon of carb. soda mixed with sufficient buttermilk to make a nice spongy consistency. Bake in hot oven 6 minutes.

Sao Biscuits.—Rub 2 large tablespoons of butter into 2 cups of plain flour with 1 teaspoon of salt. Mix to a very stiff dough with buttermilk. Roll out as thinly as possible. Cut into shapes and prick with a fork. Bake in a very hot oven for a few minutes until slightly brown and crisp.

Buttermilk Drops.—Ingredients: ¾ cup sugar, butter size of walnut, ½ cup buttermilk and chopped dates, 2 cups S.R. flour, and 1 egg. Method.—Beat butter and sugar, add well-beaten egg, then flour and fruit, and lastly buttermilk. Bake on oven slide in moderate oven.

Some Ways of Serving Tinned Fish.

[Mrs. J. Fisher, Pinnaroo.]

Salmon served with salad (either lettuce or cucumber with a little extra vinegar in the dressing), pilchards with beetroot, and fresh herrings with mashed potatoes are too well known to be mentioned, but these are not the only ways of serving these fish. Salmon is the most popular as well as the most useful variety. It can be served in very many ways:—

Salmon Rissoles.—1 tin salmon, 1 cup mashed potatoes, ½ teaspoon each grated onion and chopped parsley, 1 egg, pepper and salt. Drain salmon and remove bones, mix well with other ingredients, form into balls, flatten slightly, fry in hot fat, drain, serve garnished with lemon and parsley.

Salmon Croquettes.—1 tin salmon (drained), ½ teaspoon chopped parsley, 1 gill milk, 1oz. each flour and butter, pepper and salt, 1 egg, breadcrumbs. Melt butter, stir in flour, mix well, add milk, stir until it boils, add parsley, seasoning, and salmon, mix well, turn out on a plate until cold, form into croquettes, brush with egg, roll in breadcrumbs, fry in boiling fat, drain, serve with lemon.

Salmon Fritters.—Make a rather thick frying batter, season to taste, add 1 tin of salmon (drained). Drop dessertspoonsful into deep, boiling fat. Drain on soft paper. Serve with lemon.

Salmon Loaf.—Mince 1 tin salmon; add 1 cup breadcrumbs, 2 beaten eggs, ½ cup of milk; season to taste with salt, pepper, parsley, and lemon. Put in a mould and steam or bake for 30 minutes. Serve with white sauce.

Salmon Pie.—Mince 1 tin salmon; season, put into buttered pie dish. Cover with mashed potatoes, dot with small pieces of butter, and bake.

Salmon and Macaroni.—Make a thick onion sauce, boil 1 cup macaroni in salted water until soft but not broken. Put contents of 1 tin salmon in buttered pie dish, season with pepper and salt, pour white sauce over salmon, cover sauce with macaroni cover thickly with breadcrumbs, dot with butter, and bake. Pilchards may be used instead of salmon if desired.

Curried Salmon.—Melt 1 tablespoon butter in frying pan, add 1 chopped onion and 1 tablespoon curry powder, blend well, add 1 gill milk, stir well, draw pan to side of stove until onion is cooked, add contents of 1 tin salmon and the juice of 1 lemon, mix well. Serve with boiled rice. Crab may be substituted for salmon. Some people prefer to make a curry-flavoured sauce and heat the salmon in it.

Kedgeree.—1 tin fish (salmon, pilchards, or fresh herrings), 1 cup rice, 2 eggs, 1oz. butter, pepper and salt. Boil 1 egg hard, boil rice until soft and drain, melt butter in pan, add rice, fish, the minced *white* of the hard-boiled egg, the whole raw egg, and seasoning; mix well. Grate yolk of hard-boiled egg over and serve.

Fish Stew.—1 tin fish (salmon or pilchards), 1 onion, 1 pint milk, 1 heaped tablespoon cornflour, 1 tablespoon butter, pepper and salt. Melt butter, add onion finely sliced, cook but do not brown, add milk, boil up, thicken with cornflour blended with a little cold milk, add fish and seasoning. Serve with sippets of toast.

Fried Pilchards.—Open a tin of pilchards carefully, taking care not to break the fish. Drain carefully. Take each piece of fish with two forks, dip in egg, then in breadcrumbs; fry in boiling fat; drain, serve with lemon and chip potatoes.

Herrings in Egg Sauce.—Make 1 pint of white sauce, boil 2 eggs very hard, chop and add to sauce. Drain liquid from 1 tin of fresh herrings; warm in sauce and serve.

Scrambled Sardines.—Bone and skin 1 tin sardines, chop small and add 1 teaspoon each anchovy sauce and Worcester sauce, a little cayenne, a squeeze of lemon juice and 2 well beaten eggs. Melt 1oz. butter, add mixture, stir well and serve on buttered toast.

Sardine Savoury.—Bone and skin sardines, arrange in a shallow dish, season with cayenne and lemon juice. Pour a little oiled butter over them, cover with breadcrumbs; bake 10 minutes and serve very hot. Salmon minced, boned, and seasoned may be used instead of mince meat for sausage rolls.

Crab meat, oysters, salmon or sardines seasoned with cayenne and lemon juice combined with a good white sauce may be served in pastry cases, either puff paste or choux pastry. (The latter is the pastry used for cream puffs.)

When making white bait fritters, beat up 2 eggs with a little milk and season it, adding the fish and dropping in spoonsful into boiling fat (use no flour).

Worms in Pigs.

Mr. A. H. Robin, B.V.Sc., Government Veterinary Officer, has advised the Secretary of the Snowtown Branch of the Agricultural Bureau that the most effective treatment for worms in pigs is to mix thoroughly 1 part of oil of chenopodium with 19 parts of castor oil or raw linseed oil, and administer to the pigs individually doses of this as hereunder according to age:—

Age of Pig.	Dose. Fluid Oz.
8 weeks	0¾
10 weeks	1
12 weeks	1¼
14 weeks	1½
16 weeks	1¾
18 weeks	2
6 months	2½
9 months	3¾
12 months and over	5

(2 tablespoonsful = 1 fluid oz.; 1 dessertspoonful = ¼ fluid oz.)

It is best to shake the dose up with a little milk and give the whole as a drench after first starving the pigs for 24 hours. While this will effectively remove the worms present in the intestines of the pigs at time of administration, subsequent fresh re-infestation of the pigs must be guarded against. All voided worms should be destroyed by burning. If the pigs are held in sties, the sties should be thoroughly swept or washed out once a week, and feeding and water troughs thoroughly scalded with hot water. This will remove and destroy worm eggs and larvae. If the pigs are running out in paddocks or yards, they should be removed to fresh paddocks or yards after dosing has been carried out.

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A. P. BLESING, *Minister of Agriculture*

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Agricultural Bureau Conferences, 1937

Eyre's Peninsula (East), at Cowell, Monday, 18th October (Mr. S. D. Ramsey, Cowell), Miltalie Branch.

Eyre's Peninsula (Lower), at Ungarra, Wednesday, 20th October (Mr. W. G. Gordon).

Eyre's Peninsula (Central), at Poochera, Friday, 22nd October (Mr. F. R. Joy).

Hills Districts, at Mount Pleasant (Conference and Field Day), Wednesday, 27th October (Mr. W. K. Johns).

Fruit Districts, at McLaren Flat, Tuesday, 2nd November (Mr. W. H. Kyloh).

Each Conference will commence at 10.30 a.m. Members of Branches are invited to submit papers and questions for the agenda of the Conference in their respective districts.

Overseas Wheat Quotations

By courtesy of the New South Wales Marketing Bureau, the South Australian Department of Agriculture is supplied regularly with statements showing overseas quotations for wheat to the nearest eighth of a penny. The accompanying table gives weekly quotations in London, the State or country of origin of the wheat, and months of shipment or delivery.

Date of Quotation.	London Values.								
	S. Aus. Wheat.	W. Aus. Wheat.	Manitoba No. 3 Wheat ex Vancouver.	Argentine Wheat.	Karachi Choice White Wheat.	American Hard Winter Wheat.	White North Pacific Wheat.	Russian.	
	Aug.	Aug.	Aug.	Jan-Feb.	Aug.-Sept.	Aug.-Sept.	Sept.	Aug.-Sept.	
1937.	*s. d.*	*s. d.*	*s. d.*	*s. d.*	*s. d.*	*s. d.*	*s. d.*	*s. d.*	
Aug. 19..	5 6	5 2¼	5 8⅞	5 4⅜	5 2⅜	5 6	5 1½	5 2⅝	Victoria—4,278 tons afloat) at 5s. 1½d.
Aug. 26..	5 3¾	5 3	5 6¼	5 4¼	5 3	5 1¾	4 10¾	5 0⅜	Victoria—4,250 tons at 5s. 0¾d.
	Sept.	Oct.	Oct.		Sept.-Oct.			Sept.-Oct.	
Sept. 2..	5 3	5 5¼	5 6¾	5 2½	5 4⅛	5 2¼	—	4 11⅝	
	Sept.					Oct.			
Sept. 9..	5 4⅞	5 6¾	5 10¾	5 4½	5 6	5 4½	—	5 1⅛	South Australia—4,000 tons shipment to Ireland at 5s. 7d.
							Oct.-Nov.		
Sept. 16..	5 6	5 6¾	5 10⅜	5 3½	5 5⅜	5 2⅞	5 1⅛	5 0	

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Progressive Centennial Development of the Pastoral and Agricultural Industries of South Australia, 1836—1936

[By ARTHUR J. PERKINS, O.B.E., Life Member of the Advisory Board of Agriculture and of the Agricultural Bureau, Chairman of the Governing Council of the Roseworthy Agricultural College, sometime Director of Agriculture (1914-1936), Principal Roseworthy Agricultural College (1904-1914), &c.]

(*Continued from page* 12.)

THE FIRST DECADE, 1836-1846.

CHAPTER VII.—continued.

Governor Gawler assumes administration of Government—Receives addresses from Civil Officers and Residents of Adelaide—Governor Gawler combines Resident Commissionership with Governorship—Biographical Notes concerning Governor Gawler—Character Sketch of George Gawler—Rehabilitation and Progress of Surveys—Change in Colonisation Commissioners' Survey policy—Arrival of Lieutenant Frome and party of sappers and miners—Dismissal of Colonisation Commissioners by Lord John Russell and appointment of new Board for control of Colonisation and Emigration within the British Empire—Questionable conduct of Colonel Torrens.

In order successfully to bring about these salutary changes in the progress and achievements of the Survey Department, Governor Gawler was almost entirely thrown back upon his own initiative and the "emergency" powers that had been conferred upon him by the Colonisation Commissioners. It had already been indicated that on his arrival in the Colony he had been confronted by the unexpected and disturbing phenomenon of an Acting-Head of a non-existent staff—an Acting-Head moreover, who had promptly resigned when refused the full headship of this non-existent body. Hence, from nothing, or next to nothing, Governor Gawler proceeded to build up a competent staff under a competent leader; and he soon had the satisfaction of seeing them all busily employed in completing the surveys and locating settlers on their respective holdings. In the circumstances, Governor Gawler might well be excused a certain degree of complacency in his reply to a frantic letter from the Chairman of the Board of Colonisation Commissioners—Colonel Robert Torrens—who having just been acquainted with the news of Colonel Light's resignation and that of the great majority of his assistants, coupled with the high-handed rejection of the "Running Survey" by a large body of prospective landholders, had hastily discarded the Commissioners' usual dilatoriness in reply, and written the very next day heaping unlimited powers, and adequate means to give effect to them, on the Man on the Spot. "Under these circumstances," wrote Colonel Torrens, "the Commissioners are desirous of placing, and do hereby place, in your hands, the fullest and most ample powers to re-organise the surveying staff in whatever manner and to whatever extent may appear to you most expedient, in order to render it efficient, and to remedy, as far as may be practicable, the interruption and delay in the progress of the surveys, which these resignations will have occasioned.

"Reposing the fullest confidence in your zeal, energy, and discretion, the Commissioners will not attempt to fetter or impede the exercise of your judgment by prescribing instructions, or tracing out any particular course of proceeding for your guidance. The objects to be obtained are to expedite the surveys and to place the purchasers of land upon their locations with the least possible delay; and the Commissioners have only to request that *the arrangements which you make for their attainment may be regarded only as provisional and temporary, so that it may be left open to the Board when fuller information shall be received, to determine upon what scale the surveying staff shall be permanently established.*

"The Commissioners hereby authorise you to incur additional expense on account of the survey, which you may deem essential, whether it be in increasing the strength of the surveying staff from the neighbouring colonies or in contracting with private surveyors for the rapid execution of any quantity of work." ([27])

And it was thus that moments of special stress seemed temporarily to bring home to the Colonisation Commissioners the simple wisdom of trusting conscientious and competent men on the spot—and of the latter Governor Gawler was surely one—with unfettered control of local affairs: and particularly so when it was recollected that it took no less than 12 months to bring back the simplest decision from those who usually claimed to control such affairs from Olympian distances. Nor could particular exception be taken to the italicised "qualifying" statement which closed the second paragraph quoted from Colonel Torrens' letter provided, however, that its incidence were strictly confined to the Board's claim finally "to determine upon what scale the surveying staff shall be permanently established." Unfortunately, so soon as the Commissioners had had time to overcome their panic condition, they seemed to have become oblivious of the limitations they had voluntarily imposed upon themselves by a complete delegation of powers to Colonel Gawler; and blithely proceeded to make new arrangements, and to enter into new commitments, without in the least taking into consideration that corresponding arrangements and commitments were at the very same time being undertaken at their express behest by their better-informed delegate on the spot. As to the awkward position thus created and its consequences we shall have occasion to consider in the sequel.

([27]) From Colonel Torrens to Governor Gawler, 2nd December, 1838.

In the meantime to Colonel Torrens' urgent letter Governor Gawler replied in soothing terms that relying for his justification upon the very deep anxiety which he had reason to believe the Commissioners felt faithfully and effectually to fulfil their trust, he had ventured soon after his arrival in the province to take the very steps with regard to the Survey Department which had since been authorised by them. The services of every efficient surveyor of good character that had presented himself had been accepted: several came immediately from the neighbouring colonies, and there was then under the Surveyor-General a force of nine good surveyors in the field, a town surveyor, and three draughtsmen in Adelaide; two of the latter being available for the field whenever the public service should require it. In addition, private surveyors were being employed at the port and on special surveys. (28)

Lieut. Frome (1802-1890), Third Surveyor-General in South Australia.
[Plate 48.] (Courtesy Archives.)

On 10th May, 1839, *i.e.*, a few days over five months from the dispatch of Colonel Torrens's letter, conferring unlimited powers upon Governor Gawler for the re-organisation of the Public Surveys, and long before the Commissioners could have received any reply from Gawler as to any action he might in the meantime have taken to give effect to their urgent instructions, the former had despatched a new letter, to all intents and purposes revoking these earlier instructions, and presenting the latter with a *fait accompli* in the shape of a brand-new type of Survey Department hatched out in England. Considering the circumstances that had preceded it, the letter in question was abrupt to the point of rudeness, and exceedingly unfair both to the Governor and to the surveyors who had come to his assistance. (29)

Without preamble of any kind Colonel Gawler was abruptly informed that "Lieutenant Frome, the new Surveyor-General, who sailed in the *Recovery*, was accompanied by a detachment of 15 sappers and miners." The sudden resignation of the Assistant-Surveyors—which, after all, was but one of the consequences of the Commissioners' foolish decision—had apparently frightened the latter, and "after careful deliberation it was determined by the Board that the new staff should be composed almost entirely of men who, being subject to military control, would not have it in their power to throw up their appointment at a time when perhaps their services might be most required." It was admitted that few of the sappers and miners had had much practice in surveying, but this was of little consequence, since Lieutenant Frome was confident that they could be trained for the service in a very short time. The Commissioners had learnt shortly before the embarkation of the military contingent that several of

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(28) Governor Gawler to Rowland Hill, 17th April, 1839.

(29) This letter had been written by Rowland Hill, and from the tone of his earlier letter addressed to J. H. Fisher conveying instructions to Colonel Light concerning a Running Survey, we are already aware of what he was capable when a person had given him umbrage. In the present instance there was good reason to believe that Hill was displeased with Gawler for refusing appointment to two of his friends—Charles Mann, who had been refused the Advocate-Generalship, and G. S. Kingston the Surveyor-Generalship. Hill had even gone to the extent of congratulating Mann in a private letter on an appointment which never eventuated.

Colonel Light's assistant surveyors had, on the resignation of Kingston, been re-instated in office by Colonel Gawler: but this fact, too, it appeared, was of no importance, since in the Board's opinion, it could not create any obstacle to the arrangements that had been deliberately adopted by it. By withdrawing themselves without notice from the Surveying staff, and more especially by retaining for a time the instruments and field books—the implication in this statement was not altogether correct—and thus doing their best to thwart the intentions of the Commissioners, these gentlemen had, in the opinion of the Board, forfeited all claim to consideration: and in consequence the Commissioners requested that on the arrival of Lieutenant Frome, the survey staff should for the future be considered as consisting exclusively of Frome and the sappers and miners who accompanied him. Nevertheless, within certain prescribed limits, the Governor would be at liberty to increase the staff by adding to it any individual whom Frome might recommend as necessary to the more efficient execution of the work. (30)

This lengthy and unexpectedly unwelcome dispatch reached Governor Gawler at approximately the same time as Frome and his sappers and miners reached Holdfast Bay, *i.e.*, about the 18th September, 1838: and wise man that he was, Colonel Gawler deferred a reply in the heat of the moment and did not write until early in the following month; when he addressed to Colonel Torrens a dispatch of even greater length, but in which he made it abundantly clear in dignified and restrained language, how shabbily both he himself and the officers of the survey had been treated. He told of the utter hopelessness of the derelict survey body as he had first found it on reaching the province: of the early defection of its scheming Acting-Head: he recalled the full power that he had brought out with him to depart from his instructions, if need were, in cases of unforeseen emergency: and if there were ever to be an emergency the complete collapse of the survey body at the time when desperate colonists were clamouring for land which they had paid for months before, must surely have created one. And accordingly, he had taken upon himself the duties of Surveyor-General, and without hesitation had called to his assistance all men of competence and goodwill. Surveyors had come to him in all good faith from New South Wales, and were entitled to expect not less than 12 months continuous employment, and in common decency he could not refuse it to them: and he had re-engaged Colonel Light's Assistant Surveyors: in doing so he considered that in the name of the Commissioners he had to all intents and purposes passed an act of oblivion for past differences, and contracted with the latter binding engagements in honour and good feeling for the future. It had seemed to him more to the honour of the Commissioners that both they and himself should be set above the petty bitternesses that were agitating the colony at the time, rather than that serious and lasting notice should be taken of them. And since their appointments these gentlemen, to whom the Commissioners wished him to grant no consideration, had shown themselves to be amongst the most zealous and intelligent of the surveyors in the public service: and particularly was this the case of Mr. B. T. Finniss, whom he had appointed Deputy Surveyor-General. And finally, early last April, he was fortunate enough to secure the services of Captain Sturt as Surveyor-General. The latter "had sold a beautiful and flourishing establishment in New South Wales, left a large circle of friends, embarked with his wife and children in the commencement of the winter season at great risk, and had in nothing spared himself since his arrival to prosecute his public duties."

And when all this had been accomplished, and the surveys were in a state of satisfactory progress, came Colonel Torrens's dispatch of the 2nd December, 1838, conferring upon Colonel Gawler full powers to re-organise the Survey

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(30) Rowland Hill to Governor Gawler, 10th May, 1839.

Department, inclusive of a blank cheque for whatever the costs might happen to be: to do, in fact, what Gawler had already done on his own responsibility. And then, without even doing him the courtesy of awaiting his acknowledgment or reply, the Commissioners seemed to have turned a complete somersault: to all intents and purposes they had revoked their earlier urgent injunctions to Colonel Gawler; given the lie to their expressions of unlimited confidence "in his zeal, energy, and discretion," and their expressed determination "not to fetter or impede the free exercise of his judgment": but had proceeded deliberately to jettison all former principles upon which the Survey Department had been built, and to create in its stead a new department composed entirely of military men! In the circumstances, and in view of the fact that other Government departments of the time had proved equally, if not more, contumacious, and had been even less competent than the Survey Department, why was it not suggested that they, too, should be replaced by military nominees, with concurrent replacement of Government regulations by "martial law," throughout the service? Moreover, in this matter the Commissioners seemed to have taken upon themselves the roles of Bourbons who, though they forgot nothing, yet neither did they learn anything, since blandly oblivious to the evils of divided authority, of which one would have thought they had been given ample illustration in the stirring days of Hindmarsh and Fisher, they had so cast the terms of Lieutenant Frome's appointment, as to leave ample room for the creation of an *imperium in imperio*, with inevitable clashing between Gawler and Frome. Fortunately, however, the latter proved himself a man of commonsense, who definitely and loyally recognised the Governor as his Commanding Officer: but had he been endowed with the temperament of a Kingston, or a Mann, or a Gouger, or a Brown, or even a Fisher, there would have been troubles a-plenty.

King William Street, looking north, 1845.

[*Plate* 49.] (*From a sketch by S. T. Gill in the Adelaide Museum.*)

In the matter of executing the injunctions of this extraordinary letter, Colonel Gawler did little more than receive Lieutenant Frome and his sappers and miners graciously into the Survey Department, installing Frome as Surveyor-General and Member of the Council. As to the rest he informed Colonel Torrens that he had appointed Captain Sturt as Assistant-Resident

Commissioner, at the same salary as he had been receiving as Surveyor-General, namely £600; that he was retaining the services of B. T. Finniss as Deputy-Surveyor-General, as well as those of the surveyors from New South Wales and Colonel Light's former assistant surveyors. The immense areas of land brought into immediate use by the Special Surveys, together with the small unsatisfied balance of the Preliminary Purchases and the normal requirements of the holders of 80-acre Land Orders, would offer ample scope for the employment of all those forming part of the Survey Department as constituted by him—at all events until such times as the Colonisation Commissioners would be good enough to furnish him with fresh instructions. And thus once again—and indeed inevitably so—the foolish attempts of the latter to meddle in practical details of government, 12,000 miles away from their armchairs, and carried out under conditions beyond their understanding, had all gone awry.

It would no doubt have been interesting to have heard what had been the Commissioners' re-actions to Governor Gawler's passionate yet dignified protest against the indignities meted out to himself and his officers; and to have read Rowland Hill's orderly, but tart, curt rejoinder: but, alas, it could not be, since neither Hill nor the Commissioners, with the exception of the enigmatic figure of the Chairman, were ever to peruse Gawler's masterly treatment of Hill's insulting effort. Towards the end of 1839, Rowland Hill, who had, we are informed, during his out-of-office hours at the Adelphi, devised a scheme for penny postage throughout Great Britain, was induced to give up his permanent appointment of £500 a year, for a three-year engagement at £1,500 a year with the British Treasury, to assist and watch over the establishment and working out of his scheme. Eventually—on the 10th January, 1840—penny postage was launched in Great Britain, and in spite of the active opposition of a powerful and hostile department, coupled with the inertia of the British Government, under Hill's fostering care, it was able to make fair progress during his three years of office: sufficiently so indeed to withstand the shock of the refusal of a new Ministry to re-appoint him. Considerably later he was called back to office as Under-Secretary to the Postal Department, and was eventually knighted for his public services. How great were the benefits attributable to Hill's scheme can best be gauged by the fact that prior to the adoption of this scheme, postage rates throughout Great Britain varied indefinitely from locality to locality, and were payable by the recipient, and not the sender: and as a single instance of their burdensomeness on the public it can be stated that the postage rate for a simple letter from London to Edinburgh was, prior to Hill's innovation, 1s. 9½d. And in the course of time, as the benefits to Great Britain became more and more apparent, Hill's methods began progressively to extend from country to country, until in the course of time he could reasonably claim to have become in a world sense a public benefactor. (31) It had been thought fair to give these brief details of Hill's subsequent meritorious public career, because of the unfavourable comments it had been necessary to make upon his harsh treatment of two of the brightest luminaries in the South Australian firmament—William Light and George Gawler—and as we were now about to take leave of him, it can perhaps be added that Rowland Hill in what he did, did not appear to have been actuated by malice, but rather by mistaken loyalty to undeserving friends.

The exit of the Commissioners from offices which, apart from the Chairman, they had occupied in a purely honorary capacity for a period of over four and a half years—since 5th May, 1835 (32)—was far more undignified, almost ignominious. It would seem that after this lengthy term of unpaid services,

(31) *Dictionary of National Biography.*

(32) *The History of South Australia,* by Edwin Hodder, vol. 1, page 32.

they suddenly came to realise that the "workman was worthy of his hire," and accordingly wrote asking an interview on this subject with the Secretary of State for the Colonies—Lord John Russell—who replied, much to their surprise and perhaps to their dismay, that "Her Majesty's Government having taken into consideration the highly important subject of the alienation of the unsettled lands of the Crown throughout the British Colonies, with a view to promote, as far as might be possible, a well-regulated system of emigration, had resolved to constitute a body to superintend that service, subject to the superintendence of Her. Majesty's principal Secretary of State for the Colonies and the Lords Commissioners of Her Majesty's Treasury. With this view, it is designed to establish a Colonial Land and Emigration Board, consisting of three members. In their persons would be united the duties hitherto performed by the Colonisation Commissioners and by the Agent-General for Emigration; and with this view the Queen would be advised to revoke the commission under which the Commissioners were now acting, and to renew it in favour of the three members of the Board to which he had referred.

"It was therefore unnecessary that he should trouble the Commissioners to attend at his office on the subject of their letter of the 9th December, *or that he should express any opinion as to the expediency of maintaining a body of nine salaried Commissioners for the management of emigration to the single colony of South Australia.* But he could not close their mutual official connection without requesting them to accept his grateful acknowledgment of the ability with which their duties as members of the South Australian Commission had been discharged." (33)

That this curt, almost derisive dismissal was resented at all events by some of the Commissioners, was shown in a letter addressed by one of them—George Palmer—to the Editor of the *South Australian Colonist*, in which, after summarising what had been done by the Commissioners during their long period of office, he stated that "the whole of this had been accomplished without the British Nation having been called upon to advance a single penny: but 'on the contrary £20,000 was placed by the Commissioners, in 1836, in the hands of trustees nominated by the Lords of the Treasury as a security that the colony should never become chargeable to this country'; and in spite of all this they 'were dismissed by Lord John Russell like *drunken menials* without a moment's notice on the 23rd December, 1839, and without being granted the interview requested'." (34)

The members of "the newly-constituted Board" were T. F. Elliott, former Agent-General for Emigration, Colonel Robert Torrens, former Chairman of the Board of Colonisation Commissioners for South Australia, and the Hon. Edward Ernest Villiers, whose only claim to distinction seemed to be that he was brother to the Earl of Clarendon: and it was from these Commissioners that Colonel Gawler had the satisfaction of a reply to his dignified protest against the unheralded arrival of Frome and his military contingent, whom the former Colonisation Commissioners had decreed should completely displace all surveyors whom Gawler might have appointed at the urgent request of the self-same Commissioners.

The somewhat belated reply (35) of the new Commissioners was entirely sympathetic to Gawler's viewpoint. They began by accepting the latter's favourite tenet—which they commended—as to the undesirableness of reviving past dissensions, and expressing the view that it would be unbecoming on their part to attempt "to explain minutely the motives and objects" of their predecessors: but from the general aspect of the question they hazarded the opinion that their predecessors had been obsessed with anxiety for the parlous position of thousands of settlers, for whom no doubt they felt personally responsible, and who might be unable to take up land or to find other means of earning a livelihood: they feared that Gawler might after all have found it impossible to build up from the resources of the colonies a Survey Department adequate to the purpose: and should their fears have proved justified, the Province could scarce hope to escape stark ruin. Hence, after some weeks of hesitation, they appeared to have seized upon proposals which seemed to promise a complete solution to all their troubles, but possible embarrassment to the Governor, who in the opinion of the new Commissioners, had done everything possible to give effect to his instructions. They thought "that great credit was due to" him "for the energy and success with which under such disadvantage" he had "prosecuted that object: and in a great measure" by his "personal attention to this special department" he had "happily brought the surveys to a point which had put an end to the complaints previously so rife, and apparently so well founded." They gave their approval to all the appointments made by Gawler, "so long as the demands of the public service appeared to justify such additions to the strength of the Surveying Staff": but reminded him that the great costs of this department must be reduced so soon as the arrears of work had been overtaken.

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(33) *South Australian Register*, 20th June, 1840, page 6, col. 1.

(34) *South Australian Register*, 11th July, 1840, page 5, col. 3.

(35) Governor Gawler's letter had been written on 5th October, 1839, and should have reached England some time in January, 1840: the reply of the new Commissioners was dated 23rd May, 1840, *i.e.*, probably four months after receipt of Gawler's despatch.

[*Plate* 50] **South Australian Company's Mill on the Torrens**
(*Courtesy Archives*) (*From a sketch by F R Dixon,* 1845)

Both the "fact" and the "manner" of the summary dismissal of the Colonisation Commissioners seemed to have won the immediate approval of George Stevenson; as to the "manner" one could have foreseen that Stevenson would have applauded a method of action so much in accord with his own sardonic brand of humour: as to the "fact" he asserted that "there seemed to be an almost unanimous feeling of gladness . . . that the government of the Province had been removed from a body of Commissioners, to whose legitimate duty it had never belonged, and placed in the hands of the responsible Minister of the Crown." (36) Nevertheless, might it not prove yet another instance of a change of King Log for King Stork? Moreover, betwixt the Province and the Responsible Minister as in the past, would still intervene a body of Commissioners, for whom in the matter of their relations with South Australia the Acts of Parliament and the Instructions which had been addressed to their predecessors would still, according to Lord John Russell, form the rule for their guidance. (37)

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(36) *South Australian Register*, 20th June, 1840, page 6, col. 1.

"But," added Stevenson, "it was with unmingled satisfaction that we hailed his advent"—that of the egregious Colonel Torrens—"to the newly-constituted Board, convinced that in him we possessed a full guarantee that no departure from the principles secured by the South Australian Act would be permitted." (38) Here again Stevenson was following his own peculiar bent in belauding "a lath painted to look like iron" in the hope that it might bend to his own liking. But, he was so steeped in one-sided polemics that it was rarely possible to accept his arguments at face value; and for the same reason his estimates of men were usually wide of the mark, and generally interested. In the present instance the value of Torrens in the newly-created triumvirate was very far from apparent: in the Board room the tug-of-war was far more likely to develop between the prominent Colonial Office official supported by the peer's brother on the one side, and on the other, Colonel Robert Torrens; and the result a foregone conclusion. But from another angle, before we could agree to join Stevenson in applauding the presence of Torrens on this newly-constituted Board, we were concerned to know how he happened to be in such company. Was not this the salaried leader of a purely honorary band of men, who for over four and a half years had thought to control the destinies of South Australia? And if so, how was it when all his colleagues had been unceremoniously bundled out of office he, the leader, was now to be found consorting with the enemy, on the basis of increased emoluments? Had he any art or part in their discomfiture? Or had he sacrificed his feelings for the sake of the country he had hitherto somewhat unsuccessfully ruled? These are questions which we might ask without much hope of adequate answer: nevertheless, to say the least of it, they involved so marked a lack of appreciation of the fitness of things that we could not imagine that the Commissioners, or indeed South Australia, could have benefited much from the presence of Colonel Robert Torrens on the new Colonisation and Emigration Board.

Koonunga The Residence of a Sheep Farmer.

[*Plate* 51] (*From "South Australia and its Mines," Francis Dutton,* 1846.)

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(37) *South Australian Register*, 27th June, 1840, page 6, col. 4.

(38) *South Australian Register*, 20th June, 1840, page 6, col. 1.

CHAPTER VIII.

Land Settlement Policy of Colonisation Commissioners—"Special Surveys"—Their importance to the South Australian Company—Rising values of Town Lands—First Selection of Preliminary Land Holders.

When the Colonisation Commissioners set about the task imposed upon them by the South Australian Act "to declare all the lands of the said Province or Provinces (excepting only portions which may be reserved for roads and footpaths) to be Public Lands open to purchase by British subjects, and to make such Orders and Regulations for the surveying and sale of such Public Lands," they decreed that "Surveyed Lands shall be divided, as nearly as may be, into sections of 80 acres each, with the exception of the site of the first town, which shall be divided into one-acre sections. (¹) Such a decision anticipating, as it obviously did, the general subdivision of a vast area of unknown country—over 200,000.000 acres—into relatively small units—one-eighth of a square mile—and involving therefore an unnecessarily costly survey, would seem to indicate that the Commissioners in their complete ignorance of South Australian conditions had envisaged a succession of small farms of a type common enough in England, and well adapted to English conditions; but as experience was soon to show, not at all suited to those of South Australia, apart from a few specialised localities. That such evidently was the general impression in England at the time, would seem to be supported by the fact that many farmers who took up farming leases with the South Australian Company before leaving England, contracted for one-half of a Preliminary Section– *i.e.*, 67½ acres—and few, if any, for more than 135 acres. Fortunately, the country first thrown open to settlement by Colonel Light, extended between Adelaide and Encounter Bay, including the hills' districts, and was therefore appropriately adapted to small livestock farms, upon which pioneer farmers were able to build up local experience under conditions not altogether dissimilar from those with which they had been familiar in their home counties.

This early concentration upon small farms was in part an expression of official determination to avoid the errors of large land grants, which were known to have crippled the development of other colonies within recent times, and notably that of Swan River. Hence, it was remarkable that notwithstanding this bias for small holdings, the Commissioners should eventually have yielded to the South Australian Company—with great reluctance we are told—and agreed in 1835 to introduce a new clause into their land regulations, providing for "Special Surveys," which were eventually to form the basis upon which many large holdings were successfully erected. The original clause was worded as follows: "Anyone who shall hereafter pay in advance to the proper officer, either in England or in the Colony, the price of 4,000 acres of land, or upwards, shall have a right for every 4,000 acres thus paid for, to call on the Colonial Commissioner to direct the survey of any compact district within the Colony of an extent not exceeding 15,000 acres; and within 14 days after the publication of such surveys at the Land Office, to select his land from any part of such district before any other applicant." On the 25th October, 1839, the Commissioners issued Revised Land Regulations, which among other things increased the maximum area of the "Compact District" for which a "Special Survey" could be claimed, from 15,000 acres to 16,000 acres; and prescribed that the district should be divided into 200 80-acre sections, for which the claimant for a Special Survey, was given priority of choice for 50 sections, or 4,000 acres, chosen in such a manner that the purchaser would not acquire thereby more than two miles of water frontage.

(¹) Regulations for the disposal of land in the Colony.

Although the first "Special Survey" was not claimed until 11th January, 1839, that is to say, more than three years after the Proclamation of the Province, it must not be supposed that the value of such Surveys had passed unperceived: indeed, it can safely be asserted that the advantages attaching to them—given judicious selection—were so great and so obvious that lack of means, coupled with complete ignorance of the country, can alone have deterred pioneer colonists from seeking to acquire Special Surveys from the very outset: and more especially was this the case of the South Australian Company, with its vast resources; the company that had to all intents and purposes compelled the Colonisation Commissioners to accept this peculiar method of land settlement, which to many seemed at variance with the principles of the South Australian Act; (²) and whose representatives were already in occupation of Kangaroo Island on the arrival of Governor Hindmarsh and the *Buffalo,* and, indeed, on the arrival of Colonel Light and his surveyors. (³) And as we shall have occasion to see, a good deal of attention was given to the subject in the London-Adelaide and Adelaide-London correspondence of the Company.

The first reference to the matter available to us was to be found in a letter, dated 27th December, 1836, over the signature of Samuel Stephens—the erratic first Colonial Manager of the South Australian Company—and addressed to George Fife Angas, its first Chairman: in this letter Stephens hoped that they (*i.e.,* the directors) "would purchase a considerable quantity of more land in such a way . . . as to send" him "the necessary powers to call for some more Special Surveys of 4,000-acre blocks." Obviously, therefore, Stephens already contemplated paying for these Special Surveys by means of Land Orders, a method the legality of which was later on to be questioned by many, but which nevertheless was adopted by Governor Gawler and subsequently endorsed by the Colonisation Commissioners. (⁴) The second reference was dated 2nd November, 1837, that is to say, nearly a year later and over the signature of David McLaren, General Manager, and not that of Samuel Stephens —no longer Colonial Manager. Much, therefore, must have happened in the interim to the fortunes of the South Australian Company and those of its officers. Ostensibly, David McLaren had been sent out to South Australia to relieve Samuel Stephens of his commercial responsibilities; but also to reconnoitre some of the latter's doings, concerning which disquieting rumours had reached London. It was to be assumed that additional causes of anxiety had developed since McLaren's departure from England, (⁵) since instead of awaiting the latter's reports, the Directors revoked Stephens's power of attorney, and gave to McLaren "entire charge of the Company's affairs in South Australia, and "empowered him to retain Samuel Stephens in a subordinate capacity provided the latter's conduct should justify it." (⁶) This, for McLaren, was the prelude to many anxious moments in his brief South Australian career: both by instincts and training he was commercially minded, and a revivalist in his moments of leisure: but, unfortunately for the unexpected responsibilities that

(²) Governor Grey, among others, questioned the legality of Special Surveys.

(³) The South Australian Company's vessels *John Pirie* and *Duke of York* reached Australia on 16th August and 27th July, 1836, respectively: the *Rapid,* with Light aboard, and the *Cygnet,* with Kingston, on 20th August and 11th September, respectively, and the *Buffalo,* with Hindmarsh, on 28th December, 1836.

(⁴) Rowland Hill to Governor Gawler, 7th August, 1839, par. 5.

(⁵) It was probable that by the time the Directors of the Company had become aware of the findings of the Committee of inquiry appointed by Governor Hindmarsh to investigate the alleged demoralisation of Kangaroo Island. This Committee, consisting of George Stevenson and T. B. Strangways, had attributed the trouble mainly to the intemperate habits of Samuel Stephens.

(⁶) Edmund J. Wheeler to David McLaren, 8th April, 1837.

had befallen him, there was not the slightest tincture of agriculture in his make-up—and he knew it. In the all but universal local absence of books and balance-sheets, and it would appear, of any intelligent understanding of them, had such been available, his alarmed instincts soon warned him that with the possible exception of Banking, the commercial and industrial activities of the Company were unlikely during his brief term of office, (7) if ever, to achieve those credit balances which alone could justify his or their continuance: and he longed for "the cutting of losses" and the withdrawal from all but Banking, Land, and Wool: and by dint of clever writing he eventually succeeded: and later—but not in McLaren's time—first Wool, and next Banking both disappeared, leaving Land alone to hand down to future generations the memory of a powerful Company that had done so much to assist the Colony in its early struggling days. (8)

McLaren had taken early steps to consolidate the Company's territorial position: Preliminary Purchases in England had entitled the Company to 102 acres of City land, which had cost 12s. per acre only. At the auction sale that had followed the allotment of these Preliminary Purchases McLaren had secured an additional 66 acres at an average cost of five guineas each. Hence, the Company's 168 acres of City Land—*i.e.*, nearly one-sixth of the total City area—had averaged in the aggregate no more than £2 8s. 1d. per acre. On the other hand, as early as 1839, Adelaide land blocks were exchanging hands at the rates of £300, £350, and £500 per acre: and at a public sale, one-twentieth of an acre had realised £70, or the equivalent of £1,400 per acre. (9) These were transactions which appealed very strongly to McLaren, the Commercial Manager: the original capital expenditure was inconsiderable; the risks apparently negligible; the assets rising progressively and indefinitely in value in spite of occasional setbacks: and profits available, if necessary, at an early date for the satisfaction of expectant shareholders. Why then stray from the path of commercial certainty, and become involved in doubtful trading ventures, the end of which no person could foretell with any degree of accuracy?

And a similar line of argument appeared to McLaren to be correspondingly applicable to Country Lands: the South Australian Act had prescribed that "the price per acre which the Commissioners might declare during any period to be the upset selling price at which Public Lands shall be sold shall be a uniform price per acre, whatever the quantity or situation of the land put up for sale." And the Commissioners, as was their right, had in their turn prescribed that such Public Lands should not be sold by auction, but by sealed tenders for 80-acre sections, the price of each of which would be £1 per acre, whatever the quantity, quality, or situation of such land; and that should the same section or sections be named in two or more tenders, then the tender to receive preference shall be decided by lot. Moreover, the Commissioners in their Regulations had added that in these Land Sales the price of £1 per acre would continue in force for a period of 12 months "from and after 1st March, 1836"; thereafter, should it be deemed expedient, the price would be raised. (10) Obviously, conditions such as these, must have proved highly attractive to those willing and able to indulge in land speculation, and notably so to the opulent South Australian Company. Fortunately or unfortunately—whichever way one's political bias might happen to lean—the judicious selection of Country Lands in a totally unknown and untried country called for mental qualities quite other than those which could be successfully applied to the selection of City lands: and again, fortunately or unfortunately, the opulent South Australian Company seemed to have been singularly lacking in talent of that kind—or at all events so imagined McLaren, if one were to judge from his anxious letters of those days: nevertheless, as we shall have occasion to see later on, for raw novices in the matter the Company's officers seemed to have acquitted themselves remarkably well.

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(7) David McLaren held apparently a four-year engagement, which was slightly extended: he left Plymouth aboard the *South Australian* on 22nd December, 1836, reaching South Australia on 22nd April, 1837. He left South Australia on 11th January, 1841.

(8) For the original objectives of the South Australian Company see Appendix VI.

(9) Third report of the South Australian Company, page 9.

(10) See Appendix IV., Regulations for the disposal of Land in the Colony.

The land first thrown open for selection extended between Adelaide and Encounter Bay, together with 20,000 acres on Kangaroo Island: and in these districts the holders of Preliminary Land Orders made their selections towards the middle of May, 1838. McLaren distrusting his own judgment as well as that of his officers, sought the assistance of Samuel Stephens, who had been dismissed from the Company's service: but as the latter was now openly hostile to the Company, McLaren could hope to succeed in enlisting his services only by means of a "trick" in which he was assisted by John Morphett. The latter agreed to retain the services of Samuel Stephens for the preparation of "a list of the scale values of the different sections" thrown open for selection, together with "a statement in writing of the leading peculiarities of the different sections." He would also be required to indicate what part of the country he would recommend "for one or more Special Surveys." Stephens was not to be informed by whom his report was required, and all the information supplied was to be considered strictly confidential to McLaren. (11). This "trick," or clandestine device, was apparently successful: at all events, after the meeting, McLaren was able to assure his London Directors that the "measures" he had adopted for the occasion had been "upon the whole successful"; and to add that he had made "such a selection" of land as would justify him "in saying that the interests of the Company" had "not suffered much, if anything, by being in" his hands on that important occasion. (12) Nevertheless these transactions were not without minor disappointments, which McLaren acknowledged with his usual candour. He had been anxious to secure three sections suitable for sheep "stations," which he and his advisers had imagined to be located in District "A," adjoining the Capital City; and he had tendered for these sections accordingly: but, when the meeting broke up, McLaren and his associates had the mortification to discover that he had tendered for the wrong sections, those he had wanted being situated in District "B," immediately adjoining District "A," but the geographical centre of which was represented by the present-day township of McLaren Vale. Again, McLaren had hoped to secure several sections in District "E"—situated around Encounter Bay: but Samuel Stephens, who by that time had become aware of the "trick" which had been played upon him, and who had duly noted McLaren's intention, on vengeance bent, "handed a note across" to the latter, in which it was stated that District "E" was already quite full; with the result that McLaren abstained from tendering, but later on had the mortification of watching 20 subsequent tenders being handed in for the same District. (12)

In the meanwhile, the London Directors of the South Australian Company had come to the conclusion that the time for hesitation had passed, and that "as the success of the undertaking" seemed "now placed beyond a doubt, they" had "felt it advisable to increase their possessions to about 18,000 to 20,000 acres of freehold land." This decision, be it noted, represented a complete reversal of their original policy as outlined in their First Annual Report, namely that "warned by the history of other Colonies and Companies in that insular continent they" (the Directors) "preferred, if erring, to do so on the safe side: to purchase no more country land than necessary, but as much town land as

(11) **John Morphett to David McLaren, 5th April, 1838.**

(12) **David McLaren to Edmund J. Wheeler, 18th May, 1838.**

possible." (13) The Company already owned some 14,000 acres, in the form of Preliminary Purchases; and accordingly, in June, 1837, they wrote to McLaren instructing him to purchase 4,000 to 6,000 additional acres, under "the privilege of a Special Survey." The Directors preferred that payment for such land should be made in South Australia rather than in London, in the belief that "the Colonial Government would accept their note in liquidation of the cost." They had also received reassuring statements from the Colonisation Commissioners to the effect that although the latter would give no definite assurance that the upset price of land in South Australia *would not be raised in the future*, yet "that it was not likely to take place so as to thwart" the Company's "object." (14)

(13) First Report of South Australian Company, 28th May, 1836, page 10.

(14) Edmund J. Wheeler to David McLaren, 7th June, 1837.

APPENDIX VI.

Original Objectives of the South Australian Company.

The objects contemplated by the Proprietary were:—

1. The erection upon their town lands of wharves, warehouses, and dwelling-houses, and letting the same to the colonists, or otherwise disposing of them.
2. The improvement and cultivation of their country land, and the leasing or sale of part of it if deemed expedient.
3. The laying out of farms, the erection of suitable buildings thereon, and letting the same to industrious tenants on lease, with the right of purchase before the expiration of such lease at a price to be fixed at the time of the tenant taking possession.
4. The growth of wool for the European market.
5. The pursuit of whale, seal, and other fisheries in the gulfs and seas around the Colony, and the curing and salting of fish suitable for exportation.
6. The salting and curing of beef and pork for the stores of ships and for the purpose of general export.
7. The establishment of a bank, or banks, in, or connected with the Colony, making loans on the security of land or produce, and the conducting of such banking operations as the Directors might think expedient.

(Quoted by Edwin Hodder in the *History* of South Australia, vol. I., page 37.)

(To be continued.)

Does it Pay to Grow Hay?

[E. BORROUGHS (Ramco).]

Quite a number of blockers have a piece of high ground which perhaps is used for grazing a cow or horse. This could be used more profitably for hay-growing. Most blockers have a two or three-furrow plough and could plough the land themselves, and a block drill could be used for sowing the seed and super. Cutting the hay presents more difficulties, but usually a binder or mower is available—preferably a binder. Although the rainfall in the district is far from good, if the ground is kept free from weeds, the average yield should be about ½ ton per acre. Expenses would be approximately £1 14s. per acre, made as follows:—Ploughing, 5s. per acre; drilling, 4s.; cutting, 10s.; carting, 10s.; seed—45lbs. 3s. 3d.; Super—45lbs., 1s. 9d.; Total, £1 14s. per acre.

With chaff at present prices, hay should be worth £4 per ton on the block. In view of the expenses, it does not seem to be worth taking the risk of the low rainfall, but hay grown in the district is eaten and enjoyed more by the horses. Chaff purchased is often more or less mouldy, having evidently been damped too much when cutting is done. Chaff may be fed for the morning and mid-day feeds, when the horse has not much time to eat, but hay fed at night will give a horse more to do, and will keep it chewing. Chaff is detrimenal to the teeth.

Frost Prevention in Orchards and Vineyards

[By J. B. Harris, District Horticultural Adviser.]

Since the publication of Bulletin 292, "Frost Prevention by Orchard Heating," much additional experience of frost prevention in orchards and vineyards has been gained in South Australia and other States by Departmental Officers, orchardists and vignerons. The following is a brief account of some of the experiences in South Australia, together with a description of the type of Frost Alarm which has been found satisfactory, and instructions for the charging and maintenance of the type of battery used to operate the alarm.

Before proceeding to a description of the further tests, it may be summarily stated that many growers are now convinced that fruit and vine crops can be saved from injury or destruction by frost, and the question of whether it pays or not is one of simple arithmetic, the answer to which will vary according to circumstances, such as, value of crop to be saved, and prevalence and intensity of frosts in each individual case. For reference to costs of fuel, heaters, and burning rates, see Bulletin 292, which deals with the principles of orchard heating and the first tests carried out by the South Australian Frost Combatting Committee in collaboration with the Department of Agriculture during 1933. Since then, preparation was made for tests during 1934, 1935, and 1936.

ACCOUNT OF FURTHER TESTS.

1934 Trials.

In the spring of 1934, no serious frosts were experienced, and the following records and notes, compiled by Mr. B. Boehm, of Light's Pass, require no additional comment.

Record of Heating during 1934.

First occasion.—Alarm rang at 1.45 a.m.

	2 a.m.	2.30 a.m.	3 a.m.	3.30 a.m.
(Check) A	35° F.	35° F.	33·5° F.	34° F.
B	34° F.	34° F.	34° F.	34·5 F.
C	33° F.	33° F.	33·5° F.	34° F.
D	32° (lit 20 pots)	33·5° F.	34·5° F.	35° F.
E	33° F.	33° F.	33° F.	33·5° F.

As all thermometers were rising and the sky had become clouded, all pots were extinguished at 3.30 a.m.

Second occasion.—Alarm rang at 3.45 a.m.

	4 a.m.	4.30 a.m.	5 a.m.
(Check) A	34° F.	33·5° F.	33·5° F.
B	35° F.	34° F.	34° F.
C	34° F.	33° F.	33·5° F.
D	32° (lit 68 pots)	33° F.	34° F.
E	34° F.	34° F.	34·5° F.

At 5 a.m. the sky commenced to cloud and a breeze sprang up. Heating was then discontinued.

Third occasion.—Alarm rang at 2.40 a.m. It was a clear cold night at this hour, and a very severe frost was anticipated.

	3 a.m.	3.30 a.m.	4 a.m.	4.40 a.m.	5.20 a.m.	5.50 a.m.
A	32·5° F.	32° F.	32·5° F.	32·5° F.	32° F.	32·5° F.
B	33° F.	34° F.	37° F.	37° F.	36° F.	35° F.
C	32° F.	33° F.	35° F.	36° F.	35° F.	36° F.
D	31° F.	32·5° F.	33·5° F.	34° F.	32° F.	32·5° F.
E	32° F.	33° F.	35° F.	35·5° F.	34·5° F.	35° F.

Lit 104 pots after reading temperatures at 3 a.m. It was surprising that the check thermometer did not fall lower, the night being calm and clear with the stars twinkling brightly and all indications pointing to a heavy frost. (Notes taken during the night.) The pots were kept burning until 20 minutes past sunrise because the check thermometer was still very close to 32°F. After leaving the block on this morning, a bank of low clouds in the north-west was noticed, and as the day proceeded, these clouds accompanied a change in the weather.

1935 Trials.

Preparation was made for tests by setting out heaters on 3 half-acre plots of apricot trees with an unheated check plot of ½ an acre adjacent. In view of reported success in other parts of the State with reduced numbers of heaters per acre, it was decided to test on a small scale the efficacy of the reduced numbers. The half-acre plots were, therefore, equipped with heaters at the rate of 35, 70, and 105 per acre. As no notable frosts were experienced during the danger period—September, October, and November—in that year, no data of value was obtained.

1936 Trials.

In 1936, a further experiment was designed with the object of testing the efficacy of smaller numbers of heaters per acre. During this year, however, 2 plots of 1 acre each were used, the half-acre plots being considered too small. For checks, isolated unheated apricot trees were used, it being confidently anticipated that in the event of a damaging frost, there would be sufficient disparity between the heated and unheated trees to make the results all apparent. The 2 one-acre plots were equipped with heaters at the rate of 35 and 70 per acre respectively, the plot equipped with 35 heaters being disposed to the north of the 70-heater plot, so that the 35 plot got no benefit from the 70 plot, the drift being generally from the north-east. It is also highly probable that the 70 plot got little or no benefit from the 35 plot as the 35 heaters were not sufficient in number to heat satisfactorily the acre on which they were placed; it was noticeable while the heaters were burning that in the middle of the intervening spaces between rows of heaters the air was quite cold.

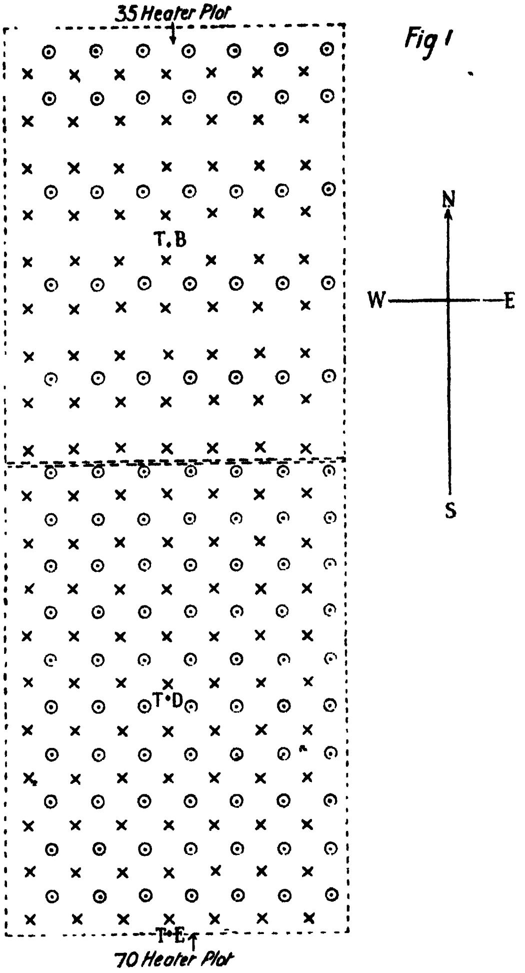


Fig 1

Heaters were installed ready for use from 1st September in case it should be necessary to burn during the blossoming period. Between 1st September and 31st October the alarm bell operated from a thermometer in which the upper electrode was set at 34° rang 11 times, the 1936 season being the worst on record in the history of the State for consecutive frosts.

The 11 alarms were recorded as follows:—

(1) On 1st September at 1.30 a.m., when the minimum temperature just reached 32°. On this occasion no heaters were lit.

(2) On 5th September, the alarm rang at 3.15 a.m. on reaching the temperature of 34° F. and the minimum temperature recorded that morning was 31°. By 4.20 a.m. the temperature had risen naturally to 33°, and consequently no heaters were lit.

(3) *Frost on 16th September.*—On this date, the alarm rang at 2.15 a.m. The writer arrived at the plots and took the first readings of the thermometers at 3 a.m. It was soon apparent on this occasion that of the 6 thermometers in use on the 2 plots, some had become erratic in their behaviour since setting out at the beginning of the season; subsequent further testing of the thermometers showed that only the records from thermometers B, D, and E, were reliable, and therefore, only these records are included in the data presented. Thermometer B was located in the middle of the 35-heater plot. Thermometer D was in the middle of the 70-heater plot, and Thermometer E was on the extreme southern edge of the 70-heater plot which location has been shown throughout the tests to be the coldest area. (See Fig. 1.)

Fig. 2—Portion of S. E Tolley's vineyard, showing telephone call box on left and thermometer shelter at right.

The temperatures recorded on 16th September were as follows:-

	B.	D.	E.
3 a.m.	—	33·0° F.	33·0° F.
3.30 a.m.....	31·5° F.	32·0° F.	32·0° F.
4 a.m.	31·0° F.	32·0° F.	32·0° F.
4.30 a.m.....	31·5° F.	32·5° F.	32·5° F.
5 a.m.	31·0° F.	32·0° F.	32·0° F.
5.30 a.m.....	31·0° F.	32·0° F.	32·0° F.

No heaters were lit on this occasion, and although trees in the vicinity of thermometer B were subject to ½° to 1° of frost, for two hours no damage was apparent to the bloom.

(4) On 17th September, the alarm rang at 3.30 a.m. The lowest temperature recorded, however, was 32.5°, consequently no heaters were lit.

(5) On 21st September, the alarm rang at 4.30 a.m.; again no heaters were lit, as there was no fall of temperature to 32°.

(6) *Frost on 24th September.*—On this date the alarm rang at 2 a.m. By 2.45 a.m. the temperature had fallen to 32° and from then until 4.45 a.m. thermometers were read at intervals, and the following temperatures recorded:—

	B.	D.	E.
2.45 a.m.....	32·5° F.	32·0° F.	32·0° F.
3.30 a.m.....	30·5° F.	30·0° F.	30·5° F.
3.45 a.m.....	30·5° F.	30·5° F.	30·5° F.
4.15 a.m.....	31·0° F.	31·0° F.	32·0° F.
4.45 a.m.....	35·0° F.	32·0° F.	33·0° F.

On this occasion, the temperature fell gradually from 34° at 2 a.m. to 32° at 2.45 a.m., and although the risk was realised, it was decided not to light heaters immediately, as it had been frequently stated that young apricots would withstand 1 or 2 degrees of frost for a short time and air drift and cloud indicated that the frost was not likely to be severe. During the next 45 minutes the temperature fell 1.5° to 2°, after which, during the next 75 minutes the temperature gradually rose to an average of 33.5°, which is above the recognised danger point. On this occasion the young fruits were not apparently damaged, but the consensus of opinion of those present now is that it is advisable to light heaters when the temperature reaches 32°, and to endeavour to maintain the temperature just above the 32°. Although no damage was apparent to the naked eye, it is considered possible that the exposure to freezing temperature which these fruits suffered may have predisposed them to greater injury by subsequent frosts.

(7) *Frost on Morning of 25th September.*—Owing to an unfortunate combination of circumstances which included a very rapid fall of temperature after the alarm had rung at 34°, the temperature had fallen to 28.5° before all the heaters were alight at 2.10 a.m. Thus the trees were subjected to 3½° to 4° of frost for a short period before all the heaters were lighted, which was responsible for the loss of some crop on the subsequently heated areas. In spite of this, a proportion of the crop was saved.

From 2.10 a.m. till 6 a.m. the following temperatures were recorded; as before, the records of certain thermometers which have been proved to be unreliable have been excluded:—

	*B	†D.	‡E.
2.10 a.m.....	28·5° F.	28·0° F.	28·5° F.
3 a.m.	30·5° F.	31·5° F.	30·0° F.
3.30 a.m.....	30·5° F.	31·5° F.	29·5° F.
4 a.m.	30·0° F.	31·0° F.	30·0° F.
4.30 a.m.....	29·5° F.	31·5° F.	30·0° F.
5 a.m.	29·0° F.	30·0° F.	28·5° F.
5.30 a.m.....	30·5° F.	30·5° F.	29·5° F.
6 a.m.	29·0° F.	30·5° F.	28·5° F.

* Middle plot, 35 heaters per acre.
† Middle plot, 70 heaters per acre.
‡ Southern edge plot, 70 heaters per acre.

On this occasion, it was deemed inadvisable to remove the flame spreaders from the heaters, and thus increase the rate of burning, as there was only a limited supply of oil on hand. It will be seen that in the vicinity of thermometer B, with 35 heaters per acre with spreaders (dampers) on, it took 50 minutes to raise the temperature 2°, whereas in the vicinity of thermometer D, with 70 heaters per acre burning with spreaders on, a rise of 3.5° was obtained in 50 minutes. The rise of temperature in the vicinity of thermometer E was only 1.5° for the same period of time, but it must be remembered that thermometer E was situated at the extreme southerly edge of the 70-heater plot, the southerly edge being also on the edge of a depression which was a recognised cold spot, and which was not heated.

(8) *Frost Commencing on Evening of 25th September.*—The alarm again rang at 11 p.m. on 25th September, and as the temperature was falling rapidly all heaters were lit immediately after arrival at the plot. By 11.50 p.m. all heaters were alight and the following temperatures were rcorded:—

	B.	D.	E.
11.50 p.m.	31·0° F.	31·5° F.	32·0° F.
12.20 a.m.	32·5 F.	33·0° F.	32·0° F.
12.50 a.m....	33·5° F.	34·5° F.	33·0° F.
1.20 a.m.....	34·0° F.	35·0° F.	33·0° F.
1.50 a.m.....	33·5° F.	34·0° F.	32·5° F.

Between 1.50 a.m. and 2.40 a.m. the heaters were refuelled, as it was apparent that the frost was likely to be of long duration.

	B.	D.	E.	
2.40 a.m.....	31·5° F.	33·0° F.	31·0° F.	(31·0 F.)
3.10 a.m.....	31·5° F.	33·0° F.	31·0° F.	(30·0 F.)

Figures shown in parentheses in the foregoing and subsequent tables are temperatures recorded from readings taken by the writer from a tested check thermometer, the property of the owner of the orchard, and situated on an unheated area of the orchard alongside the heated plots.

At 3.10 a.m. spreaders were removed from the most southerly row of heaters near thermometer E, as it was apparent that safe temperature was not being maintained there.

	B.	D.	E.	
3.40 a.m...	31·0° F.	33·0° F.	31·0° F.	(30·0° F.)
4.10 a.m...	30·5° F.	32·0° F.	30·0° F.	(30·0° F.)

At 4.10 a.m. spreaders were removed from the second southerly row, as the temperature had fallen dangerously low at that part of the 70-heater plot. The temperature had then been below freezing point on the 35-heater plot for about 2 hours.

	B.	D.	E.	
4.40 a.m...	31·0° F.	32·0° F.	30·0° F.	(29·0° F.)
5.10 a.m...	29·5° F.	31·0° F.	29·0° F.	(28·0° F.)

After readings were taken at 5.10 a.m. spreaders were removed from all heaters as thermometer D in the centre of the 70-heater plot had fallen to 31°. At this time the temperature of unheated areas was 28°, which foretold the complete destruction of all apricots on these areas. It was realised that it would have been advisable to remove all spreaders from the 35-heater plot much earlier, but on this occasion, every effort was being made to conserve fuel, as it was uncertain whether the available supply would last till sunrise.

	B.	D.	E.	
5.50 a.m...	31·0° F.	33·0° F.	29·5° F.	(29·0° F.)
6.5 a.m. Sunrise	—	—	—	
6.20 a.m...	30·5° F.	33·5° F.	29·5° F.	(30·0° F.)

All heaters were extinguished at 7 a.m.

Comparison of the foregoing figures recorded between 11.50 p.m. on 25th September and 6.20 a.m. on 26th September, showed that prior, to the removal of any spreaders, thermometer D on the 70-heater plot recorded temperatures from ½° to 1½° higher than thermometer B on the 35-heater plot. When a few spreaders were removed at the southerly end of plot D (70-heater plot), the increase over B was from 1° to 2°. When, owing to a fall in temperature, all spreaders were removed on both plots, the thermometer D recorded 2° to 3° higher temperature than thermometer B on the 35-heater plot.

Fig. 3.—Shelter shed in S E Tolley's vineyard, Nuriootpa, with telephone installed for use during vineyard heating.

(9) *Frost on 27th September.*—The alarm rang at 1.30 a.m. Heaters were fired at 1.45 a.m. on account of the temperature having fallen to 32°. The following temperatures were recorded:—

	B.	D.	E.	
2.50 a.m...	31·5° F.	33·0° F.	31·5° F.	(32·0° F.)
3.20 a.m...	31·5° F.	33·5° F.	31·0° F.	(31·0° F.)
3.50 a.m...	31·5° F.	33·5° F.	30·5° F.	(30·0° F.)
4.20 a.m...	30·5° F.	32·0° F.	29·0° F.	(29·0° F.)
5 a.m.	29·5° F.	32·0° F.	30·0° F.	(28·0° F.)
Dawn.				
5.30 a.m...	28·5° F.	30·5° F.	29·0° F.	(28·0 F.)
6 a.m.	29·5° F.	30·5° F.	28·5° F.	(30·0° F.)
6.30 a.m...	31·5° F.	33·0° F.	32·5° F.	(35·0° F.)

By 6.30 a.m. a proportion of the heaters had burned out: no spreaders had been removed on this occasion as there was no more fuel available, and it was considered advisable to prolong the heating as long as possible, rather than to have a higher temperature during the early hours of the frost, and no protection during the latter part. As on the previous night, the D thermometer with 70 heaters on the plot, recorded, with no spreaders removed, from 1° to 2° higher temperature than the B plot with 35 heaters.

(10) *Frost on 5th October.*—The alarm again rang at 4 a.m., but the temperature on this occasion did not fall below 33.5°, and no heating was necessary.

(11) *Frost on 11th November.*—An unexpected frost which was decidely patchy in its occurrence adversely affected the crop. Many growers were caught unawares by this frost as none of the alarm systems operated; some alarms are stated to have been dismantled, and others did not ring as no frost occurred in their immediate vicinity. These latter were found to be in good working order when tested early on 12th November. This, of course, indicated the necessity for a determination, so far as possible, of the invariably coldest portion of the orchard or vineyard to be protected and the location of the alarm in that position.

Although some of the crop was lost in an endeavour to reduce costs to the lowest economic limit, it was apparent to anyone visiting the plot, prior to 11th November, that where 70 heaters per acre had been used, the bulk of the crop estimated at about 80 per cent.. had been saved, and it appeared that even with 35 heaters per acre, a small quantity of fruit had been saved, and this, under conditions of repeated frost of 4° to 4½° intensity which totally destroyed the crop on the unheated trees in the vicinity. The crop harvested in January, 1937, from the heated trees, was Plot B, 1 acre, with 35 heaters—20½ cases; Plot D, 1 acre, with 70 heaters—30½ cases.

This crop was, of course, very much less than would have been obtained if frost protection had been afforded on 11th November. Also the fruit on the 35-heater plot was so extraordinarily large that it filled a greater number of cases than would have been the case with the same number of fruits from a normal crop. As stated previously, trees on the unheated areas in the vicinity produced no fruit at all this season.

Growers' Experiences of Vineyard Heating.

Mr. S. E. Tolley, of Nuriootpa, has successfully heated a heavy-bearing area of vines during recent years. In the past season, Mr. Tolley and his staff heated 10 acres of Shiraz vines during the September frosts. The vines were slightly cut by frosts as only on one small area were any spreaders removed from heaters, and then only for a short time. If all spreaders had been removed, which would, of course, have entailed greater fuel consumption, it is thought that damage could have been avoided entirely; however, during early October, it was estimated that 80 per cent. of the crop had been saved.

The exceptionally late frost on 11th November, previously referred to, did very considerable damage on about 4 acres of the 10 acre area in this vineyard, which had, until then, been saved by heating. Heaters were in place and charged ready for filling throughout the 10 acre plot, but the alarm did not ring. The 10 acre area in question actually consisted of a 6-acre block near the foreman's dwelling and an adjacent 4-acre block on rather lower land intersected by a creek and bounded on one side by a paddock which on 11th November contained a heavy standing crop of grass hay. The alarm thermometer was fixed at a point near the foreman's dwelling. On 11th November, when tested, it rang immediately, and under frequent test proved to be in good working order. Examination of the 6 acres of vines nearest the dwelling showed that no frost damage had occurred there on the morning of 11th November. Unfortunately, the frost previously referred to as patchy, had blackened most of the 4 acres of vines alongside the grass hay paddock, and along the creek. Reference has been made by another writer (Mr. E. S. West, C.S.I.R. Research Station, Griffiths, New South Wales), to the influence of mallee scrub in inducing frost, and it appears that a heavy standing grass hay crop may similarly affect temperature.

Mr. E. Dolan, of Stanley Flat, Clare, successfully heated a large area of currants. He writes as follows:—

> Our costs, which include wages, depreciation, &c., were less than £56, and we estimate on a conservative basis, a saving of 12 tons of dried currants, valued at £23 per ton, a total of £276.

Mr. William Gilbert, of "Wongalere," near Williamstown, has written as follows of his experiences in heating a wine grape vineyard located on what is one of the coldest parts of the Barossa District:—

> Last season, 1935, I lighted on two occasions—
>
> *First Lighting.*—Result inconclusive, no damage done on any unheated area. Lowest temperature —31.0°.
>
> *Second Lighting.*—Effective, some vines on unheated area partially damaged, lowest temperatures, 30.5°. Heaters used on both occasions, also this season—70 per acre.
>
> This season, 1936, on morning of 24th September, towards daylight, lowest temperature recorded —31°; no damage at this temperature, last year, so did not light up; no damage occurred on this occasion.
>
> On morning of 25th September, at 2.30 a.m., temperature 31°; no damage occurred at this temperature on previous occasions, and it was therefore decided to wait a while before lighting. The temperature remained at 31° till 3.15 a.m., and then suddenly dropped to 29°. By the time the men arrived at 3.30 a.m. the temperature had fallen to 26°; all heaters were alight by 4 a.m. and the temperature was raised to 33°; however, it was too late, and damage occurred, the loss of primary shoots being estimated at about 90 per cent.

Description of Frost Alarm.

The diagram, Figure 4, shows the arrangement of the frost alarm as used at Light's Pass, the older type of U tube thermometer and bell having been replaced by the present system for reasons stated in Bulletin 292. The single-barrel alarm thermometer shown attached to trellis post has terminals at 34° F. and at the bulb (E and G). When the testing switch D is closed the current from the four Meidinger cells H.A. travels through A, B, C (B.C. represents a relay switch), and D to E, and then through the mercury column F.G. and so back to H.A., thus completing the circuit. When the temperature falls below 34° F., this continuous circuit is broken, and the shutter C of relay switch falls, thus bringing into operation the dry cell battery, circuit C.I.J.K.L., which causes the bell to ring and remain ringing until the circuit is disconnected.

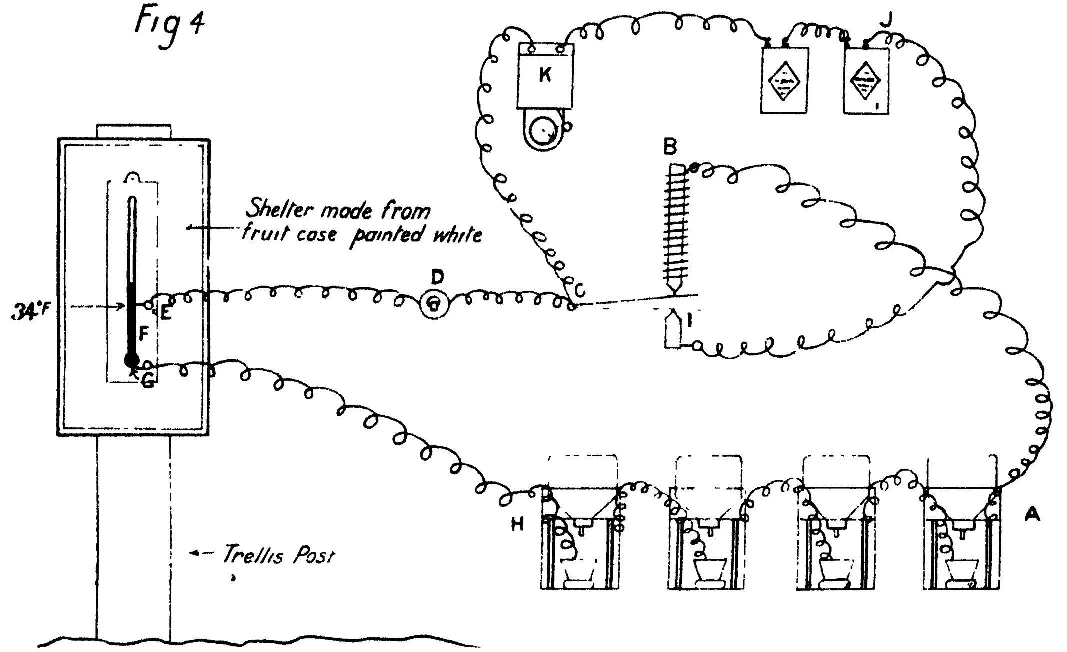


Fig 4

By switching "OFF" the switch D, the continuous circuit can be broken as in the case of frost, and thus the efficacy of the alarm can be tested each evening before retiring. The makers recommend that no current of more than 4 volts be passed through these thermometers.

Charging and Maintenance of Meidinger Cells.

COMPONENTS.

The Meidinger cell comprises lead and zinc in solutions of copper sulphate and zinc sulphate. (Note.—When newly made up, a solution of magnesium sulphate is used for starting the cell if recovered zinc sulphate solution is not available.)

The component parts of the Meidinger cell are:—

1 glass jar, S.P. No. 441.
1 glass balloon (or invert), S.P. No. 442.
1 glass cup, S.P. No. 443.
1 cork and glass tube for balloon.
1 lead plate, with insulated connecting wire, S.P. No. 78.
1 cylindrical zinc, with connecting wire.
1 battery connector, S.P. No. 173.
2lb. copper sulphate crystals.

The copper sulphate crystals are contained in an inverted balloon-shaped vessel, which is closed by a cork and tube. The latter allows the solution to leak through, thus maintaining the correct value of the solution in the neighbourhood of the lead electrode.

The lead plate is placed in a small glass vessel, and is connected to the terminal by means of an insulated wire.

A zinc electrode of cylindrical shape is inserted in the outside containing jar, and completes the cell.

ERECTION.

Care must be taken to insure that all parts of the cell are perfectly clean before attempting to pour in the solutions.

The balloon should be filled to the shoulder with crystals of copper sulphate. Water should then be poured up to the shoulder, and the cork and tube inserted. The lead electrode, after examination to see that a good connection is made with the connecting wire, should be fitted in the inner glass cup, and both should then be placed in the bottom of the outer jar. The free end of the connecting wire should be scraped clean.

The zinc plate should then be fitted in position, and the whole cell placed on the rack and connected in the usual manner. To prevent creeping, the top of the jar should be lightly smeared with vaseline. A solution of magnesium sulphate (2½ozs. to 1 pint of water) should then be made up in a separate vessel and poured carefully into the cell.

The balloon may now be inserted into the cell, great care being exercised to prevent shaking.

If desirable, the cell may be made up complete at the cleaning bench, but every care must be taken to prevent shaking the cell when it is being placed in position on the rack.

MAINTENANCE.

In renewing cells, all deposit should be removed from the zinc and lead plates, and the copper deposit on the latter carefully detached. This may be done by bending the lead to and fro and scaling off the copper deposit.

To extract the hardened copper sulphate from the neck of the balloon, the cork should be removed and the baloon placed in a bucket or sink and covered with clean water. After a time, the copper sulphate will become loose and may be removed. If the cork cannot easily be removed, it should be immersed with the bottle.

USING OLD ZINC SULPHATE SOLUTIONS.

The old zinc sulphate solution must not be wasted. The clear portion can be removed by decanting, or withdrawn by syringe or syphon. Any copper in the solution should be deposited by immersing a few scraps of zinc immediately the solution is drawn off. Thus purified, the recovered solution diluted with an equal quantity of clean water is used in setting up the cell.

Burning Rates of Heaters.

Since writing the foregoing, further tests of burning rates of heaters have been carried out with the results tabulated below. Heaters used were:—

1. Lard Pail Heater (5 quarts) with two spreaders.
2. 2½gall. Bread Pan Heater, ¾ open.
3. 2½gall. Bread Pan Heater, ½ open.
4. 2½gall. Bread Pan Heater, ¼ open.
5. "Protector" Orchard and Vineyard Heater with 1gall. fuel. Capacity, 7 quarts, ½ open.
6. 1gall. Bread Pan Heater, ¾ open.
7. 1gall. Bread Pan Heater, ½ open.
8. 1gall. Bread Pan Heater, ¼ open.

The Lard Pail Heater with two spreaders was suggested by Messrs. Gilbert & Dolan. The use of two spreaders—one on top of the other, with the rim contact points alternating reduces the preliminary burning rate, and thereby greatly increases the length of time which 1gall. of oil will burn. As the oil burns low, it is apparently necessary to remove one spreader in order to permit entry of sufficient air to keep the fuel alight, also if increased heat were required, it would be necessary to remove one or both spreaders.

The "Bread Pan" Heaters are so far in the experimental stage and have been made locally at considerable cost, as were the initial Lard Pail Heaters. The great advantage of these heaters (Figs. 5 and 6) is the reserve of oil which they carry, and the adjustable rate of burning, as shown in the accompanying table. Should there be a demand for this type of heater (and something of this type was requested at the Interstate Frost Conference at Mildura in 1935), it could no doubt be manufactured in quantities at a reasonable cost. The 1gall. type of Bread Pan Heater is simply an ordinary bread pan with a sliding lid and baffle plate. The Protector Heater is similar in construction to the Bread Pan Heater, although cubicle in shape, instead of oblong, and having no baffle plate attached to the lid, the oil tends to burn over its entire surface, even when the heater is only partially open. This type of heater is being marketed by a Victorian firm. The purpose of the baffle plate is to ensure that only a portion of the surface of the oil burns when the heater is alight, the portion of the heater behind the baffle plate acting as a reservoir. Provided the lids on the Bread Pan Heaters do not fit tight—a small detail of manufacture—they can be readily adjusted to give any required burning rate.

In studying the appended Table of burning rates, it will be noticed that Heaters 1, 5, and 8 had to be relit at the times indicated; this was due apparently in the cases of 1 and 8 to insufficient air entering as the fuel burned down. After relighting Heater 1, three times in five minutes, the top spreader was removed prior to the last lighting, after which the fuel burned for approximately a further two hours.

In the case of Heater 8, which was relit three times in 40 minutes, it was deemed necessary to increase the air and flame vent from one-quarter of the surface of the heater to one-third, after which the fuel continued to burn satisfactorily for approximately a further two and a half hours.

For purposes of comparison, it should be noted that Heaters 2, 3, and 4 were all charged with 2½galls. of fuel, whereas Heaters 1, 5, 6, 7, and 8 were all charged with 1gall. of fuel.

The attached sketch of a 2½gall. Bread Pan Heater is self-explanatory, although it may be well to add that the vents around the top appear to increase the rate of burning, and are not necessary, as the smaller type of Bread Pan Heaters burn equally well with no vents. The so-called 2½gall. Bread Pan Heaters can be made to hold 3galls. of oil if on perfectly level ground, the oil then just reaching the vents, the heater would be quite practicable for use at 3gall. capacity if no air holes were provided, and, furthermore, without such vents, should be cheaper to manufacture.

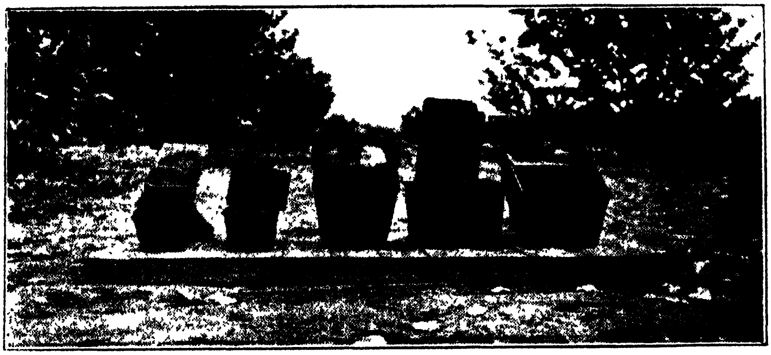


Fig. 5—"Bread Pan" and "Protector" Heaters. Second and fourth from left have lid with attached baffle plate laid across top of reservoir.

Recommendations.

To make a success of orchard and vineyard heating, it is first necessary to have ample stocks of fuel oil at hand for the replenishment of heaters as required. In our experience, it appears that heaters should be lit when the temperature reaches 32° F. for apricot trees when fruit is set and for vines when buds have burst, and that the temperature should be maintained at or just above 32° F. The number of heaters required varies with the

BURNING RATES OF ORCHARD HEATERS ON 22ND APRIL, 1937.

	Oil Capacity.	Quantity Used for Testing.	When Lit.	When Relit.	Top Spreader Removed.	Burned Dry.	Total Burning Period.		
	Galls.	Galls.	a.m.	p.m.	p.m.	p.m.	Hr.	Min.	
1. 5qt. lard pail	1¼	1	10·35	1·45 (three times)	1·50	3·47	5	12	
2. 2½gall. B.P., ¾ open	2½	2½	10·35	—	Lid fell off 10·45 a.m.	12·00	1	25	
3. 2½gall. B.P., ½ open	2½	2½	10·35	—	—	a.m. 12·51	2	46	
4. 2½gall. B.P., ¼ open	2½	2½	10·35	—	—	6·52	8	17	
5. "Protector"	1¾	1	10·35	2·45 (twice)	—	2·47	4	12	Small quantity of oil just covering bottom of heater failed to burn.
6. 1gall. B.P., ¾ open	1	1	10·35	—	—	12·5	1	30	
7. 1gall. B.P., ½ open	1	1	10·35	—	—	1·20	2	45	
8. 1gall. B.P., ¼ open	1	1	10·35	5·15 5·43 5·55	— Opened to ⅓rd at 5·55 p.m.	8·20	9	45	

type of heater and area to be heated, but using five-quart "Lard Pail" Heaters on one-acre plots not less than 70 heaters per acre should be set out for use if required. As indicated in Bulletin, 292, page 13, almost unlimited heating can be obtained by the use of sufficient heaters with spreaders removed.

To ensure economic protection, thoroughly tested accurate thermometers are essential; these should be tested at freezing temperatures, just before the frost danger period commences and again during the danger period, say, from 1st September to 1st December.

A reliable type of single barrel electric alarm thermometer should be installed and not dismantled until all danger is passed, say, about the end of November. The alarm thermometer or thermometers should be installed in the coldest portion or portions of areas which it is proposed to heat. Complete recommendations regarding frost prevention were issued by the Sub-Committee of the A.D.F.A. Frost Conference held at Mildura on 10th August, 1936, and may be found in the *South Australian Journal of Agriculture* for September, 1936, pages 162-165.

Detail of Bread Pan Heater

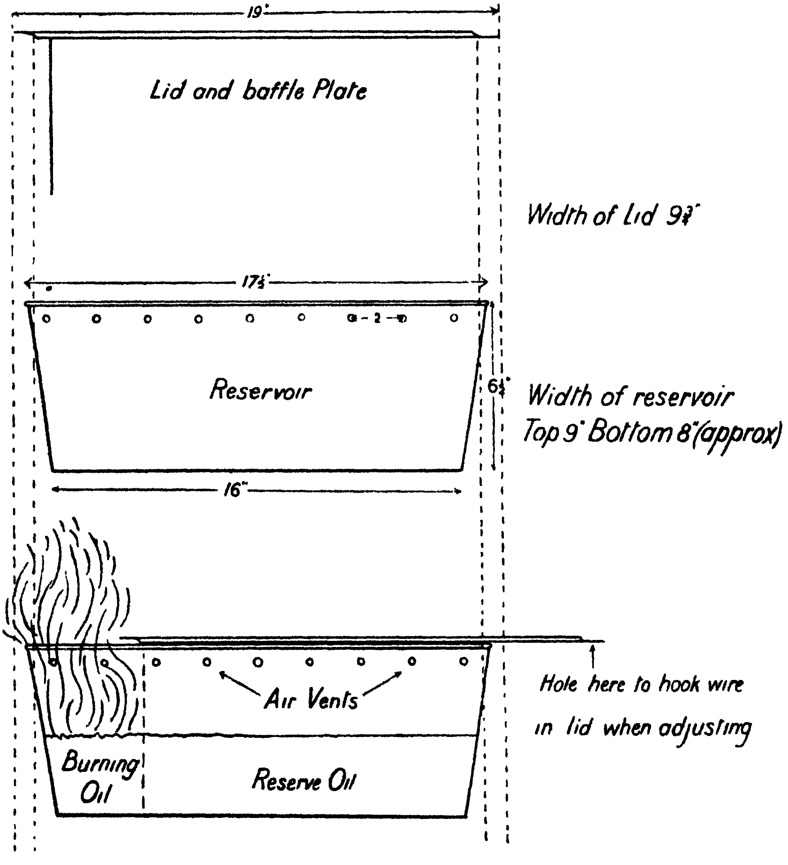


Fig 6.

J.B.Harris.
22·6·37

Rams for South Africa

A compliment has been paid to the Stud breeders of British Sheep in this State by the purchase of 93 rams of different breeds by the South African Government.

This order followed the visit of the South African Wool Delegation to the Commonwealth last year when the members had an opportunity of inspecting the studs in each State, and were much impressed with the British sheep, particularly the Dorset Horns seen in South Australia.

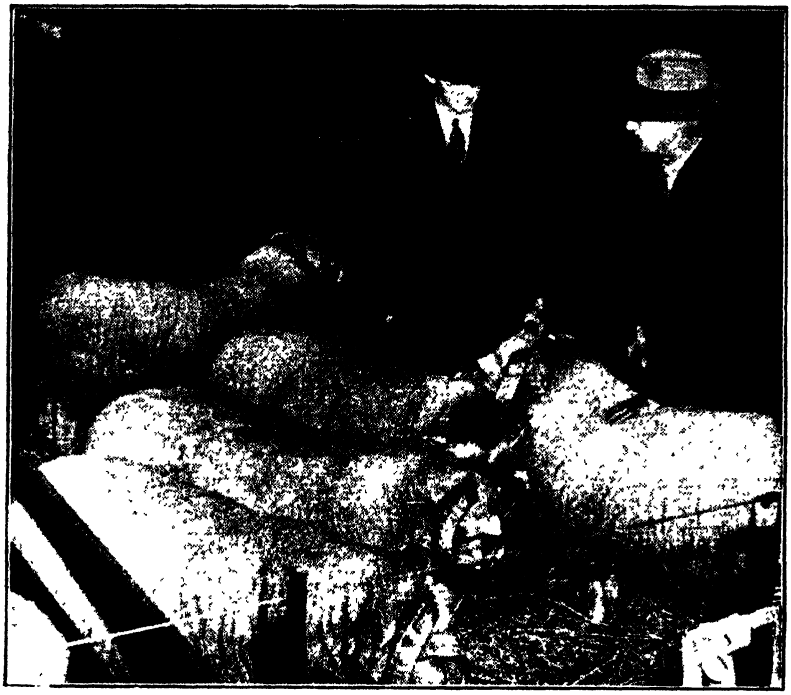
In all 46 Dorset Horn, 20 Romney Marsh, 16 Ryeland, and 10 Border Leicester selected flock rams, and 1 stud ram of the last-named breed were required.

Ryeland Rams from the stud of P. R Evans, "Evandale," Keyneton.

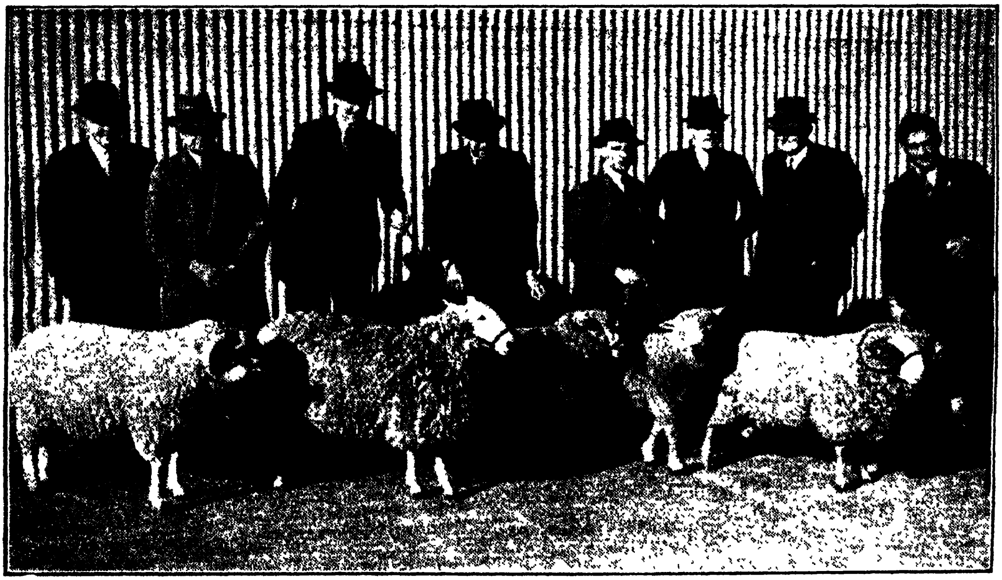
The order was for well grown 1-year-old sheep, and although most of the important studs are represented in this consignment the selection was more or less confined to the warmer and earlier districts in order to secure well-developed animals.

Breeders adopted a very generous attitude, and submitted good quality rams at reasonable prices.

As a result, there is little doubt that the South African Department of Agriculture will be well satisfied with the stock purchased, and it is hoped that further orders will continue to be lodged in future years.



Dorset Horns shipped by Mr. R. R. Hart, "Glen Devon," Lower Light.



Breeds represented in the consignment. From left:—Dorset Horn, Border Leicester, Ryeland, Romney Marsh, Dorset Horn.

Immediately prior to shipment the rams were exhibited at Port Adelaide, and a representative crowd of breeders and others interested took advantage of the opportunity of viewing the class of sheep being exported. The consignment included rams from the following studs:—

Dorset Horn—

Messrs. A. M. Dawkins, "Euro," Gawler River; W. J. Dawkins, "Newbold," Gawler River; R. R. Hart, "Glen Devon," Lower Light; W. S. Kelly, "Merrindie," Giles Corner; H. E. Pfeiffer, "Golden Ridge," Woodside; J. R. Pfeiffer, "Eureka," Woodside.

The Minister of Agriculture (Hon. A. P. Blesing, M.L.C.) and the Director (Mr. W. J. Spafford) inspect a Stud Border Leicester Ram held by the breeder, Mr. A. F. Scammell, "Horley," Kangarilla.

Romney Marsh—

Mr. C. R. Rundle, "Bratton," Salisbury.

Ryeland—

Messrs. P. R. Evans, "Evandale," Keyneton; A. S. Kidman, "Ravenswood," Mount Compass; Lewis Bros., "Calgara," Tintinara.

Border Leicester—

Mr. C. H. Mocatta, "The Avenues," Salisbury.

Border Leicester (Stud)—

Mr. A. F. Scammell, "Horley," Kangarilla.

The actual destination of these rams is not known, but it is probable that they will be placed on the different experimental farms in South Africa for the breeding of fat lambs, although some may have been secured on behalf of private owners.

Summary of Livestock Statistics for the Year 1936

[A. W. Bowden, Government Statist.]

I. Sheep and Wool.

1. *Number of Sheep*—The sheep flocks on 31st December, 1936, numbered 7,905,112 (7,945,745), a decrease of 40,633 on the record of 7,945,745 in 1935. The flocks were classified as follows:—Ewes 4,240,738 (4,222,452); wethers 1,960,268 (2,009,789); rams 111,055 (109,469). Under 1 year old 1,593,051 (1,604,035).

2. *Breeds of sheep* were reported by owners as follows:—Merino 6,630,149, Corriedale 83,830, Dorset Horn 9,104, Leicester (Border) 6,496, Polwarth 3,346, Suffolk 3,087, Romney Marsh 3,032, Southdown 2,977, Shropshire 2,375, Ryelands 1,555, Lincoln 1,423, Leicester (English) 1,159, Hampshire Downs 138, pure breds (not specified) 339, Merino Comeback 522,179, all other (including crossbred) 633,923, total 7,905,112.

3. *Lambing*, 1936 — During 1936 3,519,658 (3,408,758) ewes were mated and 2,079,426 (2,049,514) lambs marked, percentage 59.08 (60.12).

4. *Winter Lambing*, 1937.—3,531,645 ewes were reported as either mated or intended to be mated for the winter lambing of 1937. In addition 167,324 ewes were expected to be reserved for spring lambing. Details for the 1937 winter lambing are being obtained and will be published later.

5. *Wool Clip.*—7,940,476 (8.091,682) sheep and lambs were shorn, the total clip including locks, bellies, pieces, &c., being 66,743.386 (70,912,985) lbs., decrease 4,169.599 lbs. The average fleece for sheep and lambs combined was 8.41 (8.76), and for sheep only 9.72 (10.40) lbs.

6. *Total Wool Production.*—Subject to slight revision, it is estimated that the grand total wool production, including the clip and wool fellmongered and wool on local skins exported was 78,000,000 (81,709,440) lbs., decrease 3,709,440 lbs., value £4,440,000 (£4,058,236), increase £381,764, the average value per lb. greasy being 13.66d. (11.92d.).

II. Cattle.

1. *Numbers.* — All kinds 328,013 (335,354), decrease 7,341. Dairying cattle 169,761 (173,706), decrease 3,945, classified as follows:—In milk 120,554 (117,961), dry 36,181 (40,275), and heifers springing 13,026 (15,470). In addition there were 16,626 (20,030) other heifers 1 year and over which are possible additions to the dairying herds.

2. *Butter and Cheese.* — Provisional 1936-37 butter 20,500,000 (20,964,305) lbs. and cheese 12,000,000 (8,103,663) lbs. Overseas exports were—butter 7,291,690 (7,953,012) lbs., cheese 7,289,309 (3,898,651) lbs. Cheese production exceeded the previous record by nearly 4,000,000 lbs., and the oversea exports by nearly 3,400,000 lbs. Butter production nearly reached the record of the previous year.

III. Horses.

Horses—200.870 (197,368), increase 3,502.

IV. Pigs.

Pigs—85.048 (93,458), decrease 8,410.

V. Goyder's Line of Rainfall and Livestock.

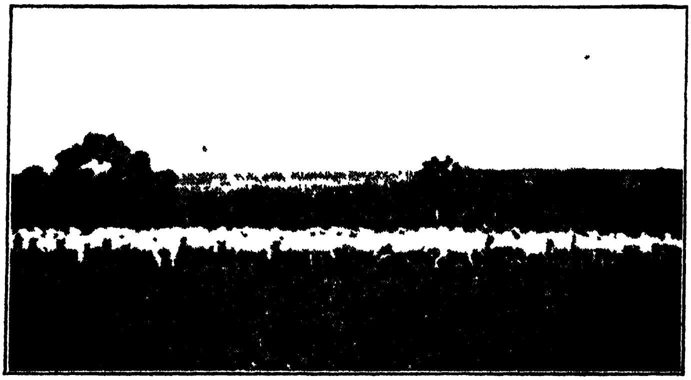
During the year 1936 the percentage to the total sheep outside Goyder's line of Rainfall increased from 28.17 to 28.52; cattle 26.51 to 28.43 and horses 26.77 to 28.12. The numbers within and without the line for 1936 were sheep 5,650,748 and 2,254.364. cattle 234,756 and 93.257. horses 144.379 and 56,491.

VI. Interstate Movement of Stock.

The State gained 26,787 head of cattle, 14,995 sheep and lost 243 horses by transit of stock between States. The total interstate imports were sheep 140,397, cattle 51.300, horses 1,770, and exports sheep 125,402, cattle 24,513, horses 2.013. Net exports of horses to oversea countries 363.

VII. Slaughterings.

Sheep and lambs 1,679.636 (1,642.550). cattle 165,663 (153,686), pigs 172,966 (153.858), oversea exports 1936-37 were 420,374 (342.179), carcases of lamb, 458 (636) carcases of mutton, 1,986.519 (1,730,598) lbs. of pork, 1,030,224 (956,788) lbs. of beef and 29,967 (106,231) lbs. of veal. Exports of lamb and pork were records.



Wireless Talks

A review of the agricultural position in the old settled areas in our hills country.

By R. Hill, District Agricultural Adviser. Talk broadcast through Station 5CK.

In South Australia, as in other young countries, agricultural practices changed from time to time. Various methods have been adopted and eventually a very definite line of agricultural thought has been followed, such as we find by the acceptance of the bare-fallowing principles in our cereal growing areas.

Bare-fallow, the use of superphosphate, the selection and grading of seeds, also the wider rotation of cropping in order to carry more livestock have consolidated the position in the lower rainfall areas of the State whereas numerous alterations in farming practices in the high rainfall districts have improved the agricultural outlook.

From the very early days of settlement, agricultural methods similar to those practised in Great Britain were attempted, but with varied success, and the necessity for adopting a change in their operations was quickly recognised by many farmers.

The growing of cereals for grain was an important industry throughout the high rainfall districts of the so-called Hills country until the commencement of this century, and existing evidence explains that some land was cropped until it failed to produce remunerative returns.

It appeared that farmers at that time had no economical remedy to recondition such soils, hence they were allowed to remain untouched with the hope that natural grasses would produce at least some grazing. In many instances the country reverted to scrub which it has been necessary to clear, since suitable methods of converting the area into profitable production have come into operation. Even at the present time it is not uncommon to find old plough furrow marks, possibly half a century old, in land that is being cleared of timber.

That early settlers were aware of the low nitrogen content of the soils is explained by the inclusion of leguminous crops, such as peas; in the rotation of cultivated crops, but only comparatively small areas were treated in that manner.

However, it was not until the use of superphosphate and the general acceptance of Subterranean Clover as a means of rehabilitating old land and converting virgin scrub land into valuable pastures that any great change in agricultural practices was noticeable.

The importance of these discoveries has been far-reaching in that soil fertility has been improved, thus preparing the way for a more diversified type of farming in the areas favoured with high rainfall.

The districts referred to have at all times been considered prosperous, and it seems that the even balance of industry, both primary and secondary, has been responsible for that position, but at the present time there appears to be greater possibilities of developing a more varied farming programme than before, and it is doubtful whether the wonderful possibilities of enormously increased production in the near future are appreciated.

The important industries already established, namely, flour, woollen and wattle-bark mills, butter, cheese, bacon and brick factories, clover seed, tanning, afforestation, fruit-growing, poultry keeping, bee keeping, wool and fat lamb raising, are perhaps the most important, presenting evidence of the country's productiveness, which up to the present time is only partially developed.

The most important phase of agriculture yet experienced has been the introduction of Subterranean Clover and superphosphate which have promoted soil improvement to a stage of development which suggests the need for a general stock-taking of the work done and a decision on the most satisfactory course to follow in improving or at least maintaining advantages already gained.

The Subterranean Cloyer seed industry has increased and will continue to do so while satisfactory prices are offered, but the raking of fields for seed has been overdone on some farms, resulting in lower yields and inferior quality of seed.

The high nitrogen level and improved organic content of soils brought about by good Subterranean Clover crops have improved soil fertility sufficiently to allow the growing of various cultivated crops and pastures which will at least maintain the present fertility of soils. Persons interested in the harvesting of Subterranean Clover seed are already transferring their operations from the old clover fields to the younger clover fields to secure requirements except where provision has been made to include fields for raking in a rotation of cropping.

Dairy cattle on a Hills district pasture.

High yields of clover seed per acre mean less cost in harvesting, a fact which should be appreciated by those raking old fields yielding in the vicinity of 3cwts. per acre, whereas those correctly managed produce around the ½-ton mark.

High yields can be had from a variety of cultivated crops grown on land which has been improved by growing clover and should a suitable selection be made the capacity to carry livestock can be increased considerably, whereas the nitrogen level of soils will be regulated, allowing clover to flourish again and provide satisfactory conditions for future cultivated crops.

Beef cattle pastured in the Hills district.

The explanation has been made to show that the clover seed industry can be continued on a mixed farm, but without attempting to discount the value of the industry, it appears certain that the legume will lose favour as a seed proposition on small farms. It will be considered more as a pasture plant in combination with introduced grasses without much loss of value as a soil improver.

Throughout the agricultural area under review there is a tendency to reduce, rather than increase the size of farms, a change which would be expected with the application of improved farming methods and increased production per acre. Accepted by only a few of the more progressive farmers, this change has been made possible by practising a more diversified type of farming which is a decided alteration in farming operations, covering the intense cultivation of crops, the subdivision of the farms into small fields, the judicious selection of livestock and the con-

A Chou Moellier crop 12 months old.

servation of fodder to carry the livestock over periods of lean pastures.

That much of the land had reached a stage of development when these methods can be practised to advantage is certain, and it is to be hoped that the wise move made by a few will be followed by landholders generally as the soil on their farms definitely shows signs of a high nitrogen level.

The old furrow marks and timber indicate that cultivation of this land was abandoned 50 years ago. Modern pasture methods have brought it back into production

Such crops as mangels, turnips, rape, chou moellier, Japanese millet, sunflowers, and some cereals for autumn and early winter feed, are already receiving more attention as suitable to grow on the improved farms.

Although much attention has been directed to pasture improvement and management, the importance of a suitable botanical analysis in pastures as a factor assisting the general health of livestock has been disregarded. However, it is pleasing to see some outstanding results in that direction demonstrated on a few farms which should, and I feel certain will, influence many more farmers in deciding their future programme of pasture work.

That the type of farming practised on land improved by Subterranean Clover will involve the carrying of more livestock is certain, and there is much controversy concerning the most profitable animal to carry on the small farm. In New Zealand where intensive methods are practised along these lines, opinions are divided as to whether dairy cattle and sheep should be carried on the same farm. However, it is doubtful whether New Zealand methods can be accepted as applicable to this State where pastures have a comparatively short spell of vigorous growth, followed by a lean period when the annual legumes are dry and not so suitable for high production from dairy cows.

Climatic conditions in the area under discussion do not permit the growing of well-balanced pastures throughout the year except in selected patches, hence the need to graze the pastures heavily during times of plenty and make provision for conserved fodders such as meadow hay and ensilage supplemented with cultivated crops in late summer and throughout autumn.

Provided the sheep kept are in the form of a flock of ewes for the production of fat lambs, they can be carried in combination with cattle because under these conditions

Pines and pasture in the Hills district.

the lambs will be marketed before the pastures lose their succulency.

In fact, where intense pasture improvement is practised, sheep plus cattle have been found necessary to handle economically the strong spring growth and the combination of cattle and dry ewes can be carried successfully over the lean pasture period by the assistance of conserved fodders and cultivated crops.

The one time popular opinion that export lambs could not be raised successfully under these conditions is a fallacy, and an increased number of excellent quality lambs is marketed each year. As a matter of fact, the regular supply of good quality lambs from the high rainfall districts has provided a continuity of supply which must be welcomed by the export trade.

The potato crop has become one of increasing importance and practically all requirements for the State are now grown within its border, because of the increased area planted in the Hills districts. Apart from the fact that it has proved to be a remunerative crop to grow, the thorough cultivation which the crop calls for makes an excellent foundation for the laying down of permanent pastures or other cultivated crops to follow.

To accept the general agricultural practices in a district as the most suitable is at times unwise, and unless analysed from time to time, methods become traditional, resulting in stagnation.

In this State we are fortunate in that the 'Agricultural Bureau system provides facilities for farmers to exchange ideas on matters of interest, take an interest in what the other man is doing, and so glean a fund of information helpful to his progress. One might ask the question, "Are primary producers making full use of this opportunity?".

Items of Seasonal Interest

Talk given by Dr. A. R. Callaghan (Principal, Roseworthy Agricultural College) over Station 5CK on 23rd August, 1937.

Rain and the Wheat Plant.

The topic of greatest moment in the country, centres round the value of recent rains, and the man of experience is able to visualise the effects of such good rains in August, both from the point of view of cereal crops, and of spring feed and fodder supplies. It means that plant life on the farm will emerge from the winter, able to make full use of the deep root systems, and direct maximum energy into growth and development.

I need hardly explain that it is during the early spring that the cereal crops make their most vigorous and spectacular growth, for it is then that the plant begins to advance towards maturity. Both root and stem development are especially rapid, and for a want of a better term, agricultural botanists refer to the upward growth of cereals as the "shooting" of the stems. It is not so commonly known, however, that early in life, much earlier than is generally recognised, the plant has set up a definite foundation; the head itself begins to form on the main shoot as early as the 3rd and 4th leaf stage, and the plant at this stage has virtually decided how many leaves it will produce. At the base of each leaf is a node. At first all the nodes are crowded closely together wrapped tightly in, and protected by, the rudimentary leaves. At the onset of spring these nodes are gradually separated by growth of the internodes between them. If conditions of plant food, and especially moisture are good, all the internodes make adequate growth, those nearer the base of the plant making shortest growth, while the internode nearest the head makes the longest, the sum total of this results in a good length of straw. If conditions are poor, especially with regard to moisture supply, the growth of all the internodes, especially the lowest ones is poor, the leaves are unable to make their full and wholesome display and the plant is said to have spindled. In other words it has come into head struggling against the adverse conditions and determined to make as good a finish as circumstances will allow.

The general rains received so opportunely during the last fortnight have prevented the plants making such a deplorable decision. Full and maximum growth of stems, leaves and roots will now be possible, and the plant will become a full-sized factory, tapping the raw materials and moisture of the soil per medium of its root systems, and its leaves shall flourish in the sunlight able to elaborate the raw materials brought to them for manufacture from the roots through the freshly grown avenues of the stems.

One might well ask why the cereal plant goes on to develop a spindly growth when conditions are adverse? Or, why does the early spring mark the zenith period of growth? It is common knowledge of course that temperatures are important, and it is generally realised that plant growth is always slow during cold frosty weather. Apart from moisture supply and temperature, there is another factor which has a most important bearing and that is the length of the day. Scientific workers, notably the Russians, have proved that plants are especially responsive to different hours of sunlight as determined by the length of the day, quite apart from the rise in temperatures associated therewith. The wheat plant, for instance, begins to run to maturity as the days get longer, and the reproductive phase of the plant can be induced much earlier by the aid of electric lights, or delayed for a considerable time by exposing plants to limited hours of light. By artificial control of the hours of sunlight, therefore, plant breeders can alter at will the time of heading of the wheat plant. This development of botanical science labours under the expressive name of photoperiodicity, simple enough when one remembers that "photo" means light.

What to do with the Surplus Spring Growth.

The rains have assured, above everything else, that there will be an abundance, or in most cases a superabundance, of spring growth. There are three ways of dealing with excessive pasture and fodder, firstly, to stock up to full capacity and feed it off, which besides being difficult for everyone to do, is risky and a poor policy, secondly, it can be half-grazed and a large quantity allowed to waste and the remainder allowed to stand into the summer, lose much of its feeding value, and be a source of danger and anxiety when bush fires are prevalent, or, thirdly, it may be judiciously managed so that certain areas are allowed to make full and maximum development so that hay or silage may be made from it. By setting aside definitely an area of well-grown pasture and allowing it free growth from now on should assure a splendid cut of meadow hay, or silage later on. Even in the earlier agricultural areas there will be sufficient surplus fodder in many cases to enable hay or silage to be made.

The making of hay is understood by most farmers, but although silage making is no more difficult farmers are not very conversant with the procedure.

The handling of self-sown or pasture growth, where a binder will not work, requires the use of a mower. At Roseworthy College we have attached to the knife-blade of the mower a series of curved rods of increasing length. When the fodder is cut these curved rods roll the swath into a low windrow. These are then collected on push rakes or sweep rakes and drawn to the site of ensiling, where it is tipped. The green material is then deposited in the silo, or the stack. For elevating on to a stack the use of grab and tackle hoist is necessary. Details of this equipment, which by the way is not in any way costly, are available in publications made on the subject from time to time by the College and will be supplied to anyone on application.

There are a few points concerning the building of silage stacks from loose cut fodder which I would like to make, hints that will make all the difference to the handling and manufacture of silage.

Essentially successful silage making depends upon effective exclusion of air and the only means of driving air from the mass is to pack the material as tightly as possible. To do this, weight is necessary, and the most economical method of weighting is to make full use of fresh fodder being applied from time to time. It is a golden rule, therefore, not to sacrifice height in building a silage stack, so that at the outset the base should be kept small. If built on a small base to a height of at least 18ft. to 20ft., and rebuilt to the same height two or three times after allowing for settling, then the exclusion of air from the greatest bulk of the material follows as a natural sequence. Further than this, after settling the stack is presentable and not a squat, ridiculous butt that it would be if the base had been twice the size and the height half as high. Under no circumstances should this factor of height be neglected in stack building. The best class of stack to build with loose cut fodder is a round stack, and for a stack to hold, say, 100 tons, a diameter of only 24ft. or less is required, providing the building is carried on to a height of 18ft. and 20ft. and allowance is made for settling say two or three times, according to subsidence of the fodder.

Naturally, to build a haystack to contain the same quantity would require a substantially greater base than this, but remember that to make good silage air must be driven from the stack and to do this the green material added from day to day, representing several tons, will supply the necessary weight to drive the air from the underlayers of fodder already stacked and thereby control the temperature and allow correct and desirable fermentation to proceed for a much longer period.

In building it is essential to keep the sides straight, or safer still, build them slanting in very slightly. At no time should the walls of the stack be built out as is usual and desirable in building haystacks. It is also very desirable to keep the middle of the stack level or slightly below the level of the margins and not crowned up as when building a haystack; at all times the outside margins should be kept as firm and tight as possible.

There is another very valuable hint which the practical man at first is rather apt to scorn, but which, if regularly adopted, will save endless difficulty. Unfortunately silage stacks have a tendency to slip over, and this is caused by uneven settling. Uneven settling is caused partly from uneven building, which must be avoided at all cost, but it is quite often due to a rapid rise of temperature on one side of the stack frequently brought about by a wind blowing on one side of the mass. In such cases the heat becomes concentrated on the leeward side of the stack, where settling takes place much more rapidly than where the temperature is cooler on the windward side. This uneven settling causes no end of trouble, but it can be avoided by protecting the side of the stack from the prevailing wind, during the whole period of building and thus preventing the concentration of high temperatures in any one locus.

With loose stacks, provided four to six feet of fresh fodder are added daily, weighting down at the end of each day's work is unnecessary, but after the final loads have been added weights to the equivalent of 1cwt. per square foot should be placed on top, making sure that the weight is evenly distributed right out to the very margins of the stack.

The Marketing of Fat Lambs.

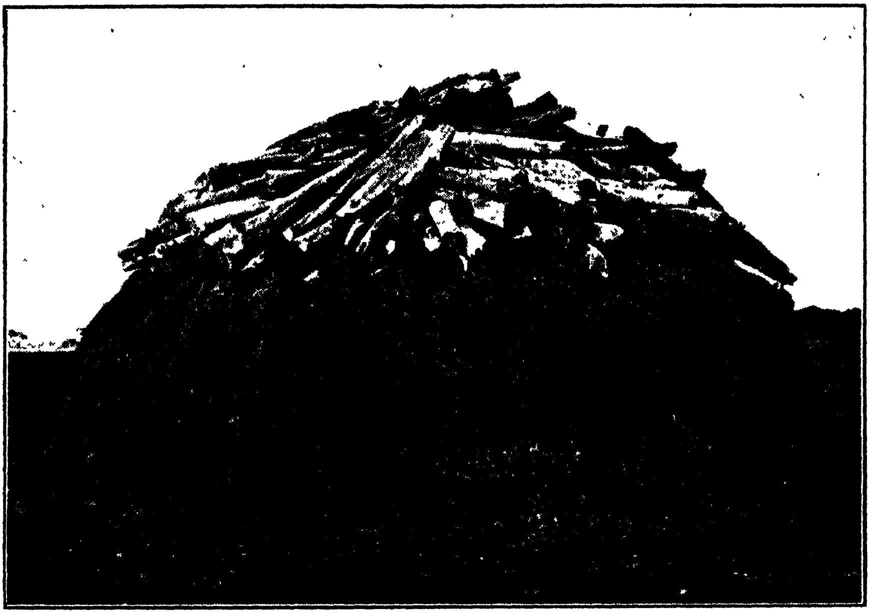
With luscious feed available fat lambs will be ready for market in increasingly large numbers from now on. A visit to the Abbatoir sale yards is sufficient to convince any observant onlooker that the average producer does not pay sufficient attention to the marketing of his animals and especially fat lambs. Just because a flat rate of about £1 a head can be expected for any reasonably good sucker lamb is no excuse for the producer not getting more, and in fact, by proper grading of his lambs a better price would undoubtedly be obtained.

The large scale producer is rather apt to put too many lambs of variable weight in the one pen, lambs that will vary in dressed weight from 28lbs. up to say 37lbs. This presents a problem to the buyer when lamb is bringing 6d. to 7d. a lb., and in estimating his price he is certainly going to be on the safe side. If, on the other hand, the lambs were divided into two, or even three, lots, according to their weight, the buyer would be able to bid with confidence up to full value.

The smaller producer errs in placing lambs of almost nondescript type with lambs of better quality, or, by presenting for sale in one pen a number of lambs of mixed origin. These invariably have an uneven and unattractive appearance. In forwarding lambs to the agent they should be distinctly marked with raddle so that they can be easily and quickly divided into groups for sale.

There is really no excuse for marketing lambs not in finished condition, and generally speaking lambs should dress between 32lbs. to 34lbs. to be in good bloom, this is especially true of those sired by the Southdown and Shropshire. The lambs sired by the Dorset Horn, Suffolk, and the Ryeland generally dress better if they are slightly heavier, but now that the market is dependent on the operation of export buyers, the dressed weight of lamb should not, for preference, exceed 36lbs. The export market requires light lamb dressing from 28lbs. to 36lbs., but generally speaking, under South Australian conditions it is very difficult to get any finish and bloom on lambs which will dress 30lbs. or under. They can, however, be placed on the market in prime finished condition to dress 33lbs. to 36lbs.

The average lamb dresses about half the live weight, but where the lambs have been sired by the thicker, better fleshed sires like the Southdown, Dorset Horn, and Ryeland out of crossbred, halfbred, or grade Corriedale ewes they will dress 2lbs. over half the live weight. For all practical purposes, therefore, lambs should be marketed when they reach 63lbs. to 70lbs. live-weight. A few examples will suffice to make this clear. A consignment of 12 lambs were sent by the College to the Abattoirs on the 28th July for export. The average live weight of these lambs was 65lbs., with the heaviest lamb 66½lbs. and the lowest 63½lbs. These lambs dressed an average weight of 34½lbs., ad the heaviest carcase was 36lbs. and the lowest 33lbs. In this case the average dressed weight was half the average live weight, plus 2lbs. Then again, on the 5th of this month another consignment of 12 were sent for export and these averaged on the farm 63lbs. and on the hook 34lbs. In both instances the breeding of these lambs was by the Southdown out of Border-Leicester-merino ewes and they dressed carcases fat and finished in splendid bloom.



Lambs must be handled with the greatest care if bruising is to be avoided. They should never be caught by the leg, or by the wool and the use of sticks and dogs should be avoided. Move them about quietly and handle them like "butter-balls."

I cannot close these remarks on fat lamb marketing without referring to the appal-skins and the meat thrown in, it makes one wonder why lambs should ever reach such unfinished stagnation in a sheep minded country like ours. Lambs must be kept on the mothers right to the last minute, and unless the ewes are milking well, on good feed, the lambs will make no progress, they are checked, are open to parasitic infection and never really recover.
ling condition of some lambs marketed, and when the auctioneer offers them for the

Then again, some producers are marketing long-tailed lambs, surely this is poor husbandry, and a dirty uninspiring comparison with lambs that have been properly docked. I made some enquiries as to why so many lambs were marketed with long tails and one man assured me it was done to avoid a check to the lambs and enable them to be marketed earlier. This is wholly fallacious, and well carried out before the lamb is three weeks old, tailing has little or no check on the lambs. Anyhow, many producers market lambs in full marketable bloom at 12 weeks of age; this I think, is the answer to the man who considers that the tailing of lambs retards their development.

Working the Fallows.

Ploughing of land to be cropped next year, thanks to good rains just after seeding in June, was completed in most districts earlier than usual. In many cases the land has been harrowed down, or cultivated, and in others it is still in the furrow slice.

While showers continue it is impossible to work the fallows, but weed growth can be held in check by the use of dry sheep. Ewes suckling lambs should under no circumstances be used for fallow grazing. As soon as possible the cultivators should be put to work, and a deep and thorough working will be advantageous at this time of the year. Normally the initial cultivation of bare fallow after ploughing can be carried out almost as deep as the plough cut, but since good rains have fallen many fine particles of soil have been sifted out by the rains and washed to the lowest level of the plough cut, making a very valuable beginning to the seed bed. The cultivation which is now necessary should not, therefore, go to the full depth of ploughing, as it is most important to leave these early foundations of the seed bed undisturbed.

If cultivation is unduly delayed, difficulty might be experienced later to get the fallow in bright clean condition before other work connected with harvest calls for attention. Sheep will undoubtedly help, but farmers should not forget that sheep are not a satisfactory substitute for a cultivator.

Review of the Competition for the Month of August, 1937

By C. F. Anderson (Chief Poultry Adviser) and A. Clifton (Competition Attendant).

Weather conditions on several occasions during August were particularly bad from a poultry point of view. The cold wind and driving rain undoubtedly affected production. For August the production was 7 per cent. higher than it was for the previous month—61.7 per cent. as compared with 54 per cent. for July, and 63 per cent. for August of last year. This season's production does not seem to be up to the standard of last year. The percentage of first-grade eggs for August can be considered quite satisfactory, being 85.4 per cent. compared with 82 for the month of July.

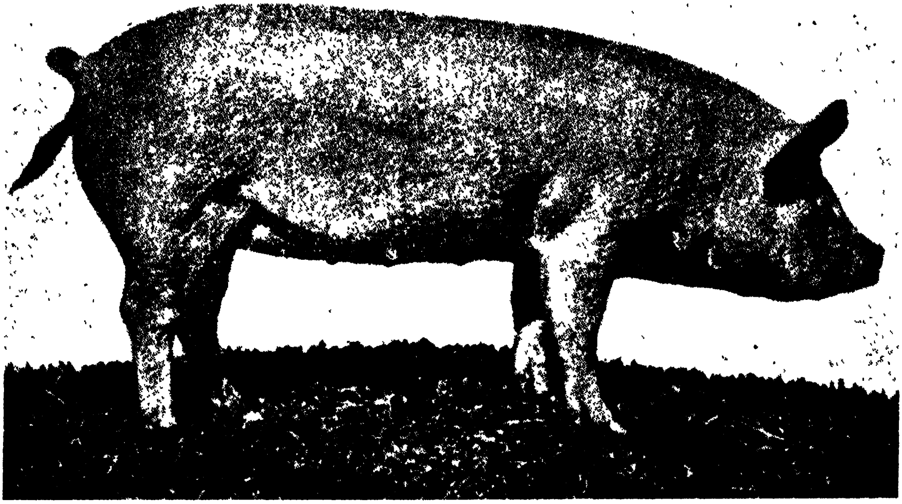
In the White Leghorn section, the leading bird owned by Mr. S. Hill retained a good lead over all competitors in that section, being 10 eggs above the second bird up to the end of August. With the exception of this bird, scores in the White Leghorn section are not up to the standard of previous competitions. Several of the good layers in the early months of the competition have not reached the minimum weight for a first-grade egg—that is, 2oz. since this came into force, on the 1st July.

The Black Orpington, owned by Mr. C. A. Maxwell, after laying a soft-shelled egg in the last week of July, stopped laying for several days, allowing the bird owned by Mr. H. J. Mills to take top position. During the last week in August the production, principally among the leading Orpingtons, has considerably fallen off. This coincides with the bad weather experienced during that period.

Mr. H. H. Gallagher's Light Sussex still continues to lay well; as a matter of fact, she is only one egg behind the top bird in the Competition, which is a Rhode Island Red pullet owned by Master K. Johnson in the Home Project Section. It is interesting to see that there are some very good layers in the Home Project Section. There are two White Leghorns in this section with better scores than those in the White Leghorn Section, with the exception of the leading bird; and also an Orpington with a better score than the leading bird in the Black Orpington Section. This is particularly gratifying, seeing that there are only 42 birds entered in the Home Project Section for home project workers.

The Black Orpington entered by Mr. V. F. Gameau in the Soaked Grain section has again laid particularly well during August, having laid 27 first-grade eggs for the 31 days, and at the end of August was only one egg behind the leading bird in that section.

Three birds died during August, which is the highest number in any one month since this Competition commenced, and brings the total to 7.



Export Pig Competitions

To encourage the breeding of the right type of pigs for the export market, and as a means of advertisement of the Australian product overseas, the Australian Meat Board is inaugurating this year competitions for classes of export Porker and Baconer carcasses.

Conditions have now been finalised, and entries for the first competition will close on 15th October next. Carcasses will be judged in London on or about 15th December.

No entry fee will be charged, but only those entries adjudged as of first grade export standard by a Commonwealth Inspector will be eligible to compete. Each entry will include three carcasses.

Prizes to the value of £25 will be provided by the board for award in each class and two trophies each valued at £10 10s. have been donated. The board will also pay ¼d. per lb. in the case of Baconer carcasses as compensation for depreciation incurred by mutilation in judging.

Entries in the Porker class must be between 60lb. and 90lb. dressed weight and, in the Baconer class, between 120lb. and 160lb., including heads in each case.

Entry forms may be obtained from the office of the Australian Meat Board, 419, Collins Street, Melbourne, from the Veterinary Officers of the Department of Commerce in each State, and from works treating pigs for export.

Tubercle-free Herd Scheme.

The following herds have been tested and comply with the conditions laid down by the Tubercle-Free Scheme, whereby stud-owners may apply to have their herds tested, free of charge, by the Stock and Brands Department:—

Owner and Address.	No. of Cattle.	Expiry Date.
1. J. H. Dawkins, Para Wirra Jersey Stud	25	16/4/38
2. W. Hawker, Anama Friesian Stud, Central Bungaree, *via* Brinkworth	40	26/6/38
3. O. H. Woodward, Marama Jersey Stud, Gilles Plains	22	2/11/38
4. G. L. Hampton, Cloverdale Illawarra Shorthorn Stud, Echunga	25	12/8/39
5. J. M. Bray, Sweethaven Jersey Stud, Langhorne's Creek ..	26	19/8/39

The Pig Industry

The Commonwealth Statistician recently reported that a remarkable expansion in the production of pork in Australia has been recorded, and that during the past 10 years the production of bacon and ham has fluctuated between 68,000,000lbs. and 78,000,000lbs.

Up to the year 1928-29 the production of pork was sufficient to meet local requirements, and to provide a small exportable surplus which averaged about 200,000lbs.

In 1929-30 the first indication of the subsequent expansion was recorded when exports increased to nearly 1,000,000lbs. This increase was gained at the expense of local consumption.

Commencing in the year 1930-31 production increased annually, and has been sufficient to provide for a 50 per cent. increase in local consumption and an outstanding increase in the volume of exports, particularly since the year 1933-34.

The following table shows the production and exports of pork from Australia:—

Year.	Production. Lbs.	Export. Lbs.
1928-29	39,721,871	199,336
1929-30	39,432,504	932,297
1930-31	50,297,146	8,629,901
1931-32	50,950,080	7,383,355
1932-33	59,334,671	6,703,234
1933-34	63,236,837	8,663,864
1934-35	78,063,364	15,636,132
1935-36	84,011,115	23,577,743
1936-37	(figures not available)	26,690,628

Queensland increased its production nearly three-fold, whilst that of New South Wales and Victoria was doubled. Increased production was also recorded in the other States; their combined output in 1935-36 was, however, only 16 per cent. of the total production.

As in the case of other dairy produce the United Kingdom is the chief market for pork exported from Australia. Of the total export of 26,690,628lbs. in 1936-37, the United Kingdom took 26,110,146lbs.

The production of bacon and ham in Australia is sufficient for local requirements, and provides a small quantity for export. The latter has averaged slightly more than 1,500,000lbs. annually, and is consigned chiefly to the Pacific Islands and the East. The production in 1935-36 was 77,655,178lbs., of which 1,701,575lbs. was exported. In 1936-37 the export was 1,736,118lbs.

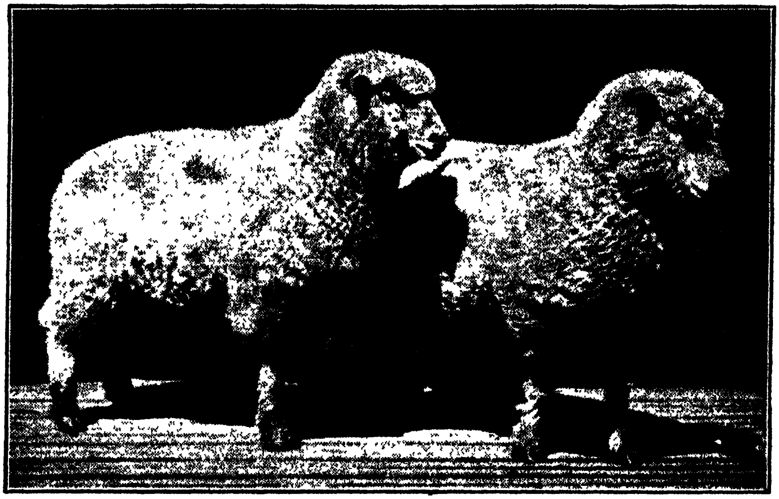
Acid Yeast.

The following information has been supplied by Mr. A. L. Thomas, of North Unley, in response to a question from the Lameroo Women's Conference, asking how to make acid yeast:—Take 6 pints of water, 1½oz. tartaric acid, 7 potatoes. Boil potatoes, then strain and mash. Then pour the water back on potatoes. Add 6 pints of cold water and stir. Then get the liquor at 80 degrees and add tartaric acid and a good ½ cup of spontaneous yeast. Whisk up well and put away to ferment. When you find the head on the brew beginning to drop, give it a good whisk, and it is ready for use. 1 pint of this yeast will make 20 loaves of bread. It is worth while to mention that you cannot set one brew to another from acid yeast, because it will not act. You must set each brew off with spontaneous yeast. Two or three bottles of spontaneous yeast will keep for years, well corked up. Should the temperature be about 90 degrees, make the dough about 78 degrees, and it should be ready in about seven hours to make into bread.

All-Australian Export Lamb Competitions

Conditions have now been drawn up and arrangements finalised by the Australian Meat Board in conjunction with the Council of the Australian Society of Breeders of British Sheep for the holding of an All-Australia Export Lamb Competition during the 1937-38 export season. This will be the first occasion upon which one series of competitions open to all States has been organised.

Entries will be judged monthly from September to February inclusive.



Where conditions governing State competitions conducted by various branches of the Society are identical, or are brought into line with those of the All-Australian Competition, entrants in the Commonwealth series will be eligible to compete not only for the All-Australian trophies and cash prizes, but also for the respective State trophies and cash prizes.

The objects of the competition are the enhancement of the reputation of Australian lambs in the United Kingdom and the encouragement of producers to breed the types of lambs best suited to the requirements of that market.

The lamb most in demand in the United Kingdom is the "Down" type found mainly among lambs of Southdown strain, but there are also other good marketable types of lambs produced in Australia. The All-Australian competitions will therefore be held for two classes, the first of which will be open to lambs sired by Southdown rams, and the second to lambs sired by other breeds of British rams. Purebred lambs of British breed are not considered a commercial proposition for meat export purposes, and entries will therefore be restricted to lambs bred from rams of British breed (exclusive from flocks registered in the recognised flock books) and from ewes of any of the following breeds:—Crossbred, Comeback, Corriedale, Polwarth, or Merino.

Prizes to be awarded by the Australian Meat Board will be:—

All-Australian Grand Champion: Trophy valued at £10 and cash prize of £30.

All-Australian "Southdown" Champion: Trophy valued at £5 and cash prize of £25.

All-Australian "Other British Breeds" Champion: Trophy valued at £5 and cash prize of £25.

The above prizes will be competed for from entries from every State and will become the property of the producer who, in the opinion of the judge, secures the highest aggregate of points with two entries. The "Grand Champion" prizes will be open to all entrants in either class, but the winning entries in this class cannot compete for the "Southdown" or the "Other British Breeds" prizes.

The Australian Meat Board will purchase or arrange for the purchase of all lambs accepted for the competition at the highest "bare meat" price per lb. for "Spring Lamb" of equivalent quality and range of weight realised in Melbourne during the week in which the competition lambs are slaughtered. As a further encouragement to producers to enter the competition, the board will pay in addition a premium of not less than ¼d. per lb. on all lambs accepted for the competition. The competition will be for pens of 5 lambs selected if desired from drafts of 7 submitted. Only lambs adjudged of high quality first grade by Commonwealth Inspectors will be eligible to compete.

Judging will take place in London and will include a block test, whereby points will be awarded for distribution of fat and lean meat as well as for conformation of carcass and suitability to English market requirements.

Every use will be made of the competition lambs for advertising purposes, and special displays will be arranged in retail shops after the judging is completed.

The conditions governing the competitions are set forth on the entry forms which are now available and may be obtained upon application to the following:—

South Australia—The Secretary, Australian Society of Breeders of British Sheep, 7, Pirie Street, Adelaide.

The competitions will be controlled by a Central Management Committee representing the Australian Meat Board, and the Council of the Society of Breeders of British Sheep. The committee will function in Melbourne at the office of the Australian Meat Board, 419, Collins Street, Melbourne.

Value of Farm Horses.

[W. KIES (Murraminga).]

During the past year some districts, particularly in the Mallee, experienced adverse seasonal conditions, which resulted in shortage of feed. This, together with the advance in the price of wheat, may have influenced some farmers, despite past experience, to scrap their horses and install tractors. It may be an opportune time to issue a warning that there is a risk in such action. Even if other forms of power are favoured, it seems an unwise step to discard the horse team. It would be safer to retain the horse, which has proved conclusively during the depression that it is the most economical unit on the farm. The Clydesdale horse is the most suitable worker for Mallee areas. A cross with the Arab strain mare has proved a most efficient worker and can be recommended for the Mallee. Much wheat chaff, which would otherwise go to waste, can be consumed by the horses (mixed with a few oats and a little bran), and the horses will work well on such an economical ration. Farmers should keep a well-bred Clydesdale stallion, which could be worked throughout the year. Working the stallion tends to keep him hardy and vigorous for the breeding season if required. Breeding 5 or 6 foals each season will replace aged horses, and the breeder can sell a horse or two as well. The service of neighbours' mares or even of mares in surrounding districts would pay for feed for the stallion. For a hack there is one type recognised throughout the world as a sound stayer, that is the Arab desert horse. The true type of Arab horse is not obtainable, but there are descendants of Arab horses in Australia, and horses of this type are noted for their staying power and hardiness for stock work on farms every day. Such work is a tremendous task for a hack, which is the horse which is most worked on the farm. The hack should be well cared for and fed on the best of rations.

Feeding Tests at Parafield Poultry Station.

A new series of feeding tests was commenced at Parafield Poultry Station on the 1st April, 1937. Five tests have been arranged each of 50 White Leghorn pullets. The principal object of these tests is to collect some accurate data concerning the results obtained from the soaked grain method of feeding in different ways, also the production of the birds under the various methods of feeding. The following is a list of the tests that have been arranged:—

A. Morning—Soaked wheat at rate of 8lbs. grain per 100 birds, meat meal ½lb. per 100 birds, greenfeed same quantity as dry grain. Afternoon—Same as morning, but meat meal ¼lb. per 100 birds.

B. Morning—Soaked wheat at rate of 8lbs. per 100 birds, ¼lb. meat meal per 100 birds, ¼lb. linseed meal per 100 birds, greenfeed same as No. 1 test. Afternoon—Same as morning, but without the ¼lb. linseed meal.

C. Morning—Soaked wheat once a day at rate of 8lbs. per 100 birds, meat meal ¾lb. per 100 birds. Afternoon—Dry wheat at rate of 1¼ozs. per bird.

D. Morning—Soaked barley twice a day at rate of 8lbs. per 100 birds, greenfeed same quantity as dry grain, meat meal ¼lb. per 100 birds. Afternoon—Greenfeed same quantity as dry grain, meat meal ¼lb. per 100 birds.

E. Morning—Soaked wheat and barley at rate of 4lbs. wheat and 4lbs. barley per 100 birds, greenfeed same bulk as dry grain, meat meal ½lb. per 100 birds, linseed meal ¼lb. per 100 birds. Afternoon—Dry grain at rate of ¾oz. wheat per bird and ¾oz. barley per bird.

The quantity of food as stated in the test will vary from time to time according to the requirements of the birds. The quantities stated in the tests are given as a basis, but are also liable to alteration according to the requirements af the stock.

Test.	No. Eggs Laid from 1st April, 1937. to 31st July, 1937.	No. Eggs Laid, August, 1937.	Total Eggs Laid from 1st April, 1937, to 31st August, 1937.
A	2,079	824	2,903
B	1,859	780	2,639
C	1,810	769	2,579
D	1,269	716	1,985
E	1,645	716	2,361

	Value of Eggs.		Cost of Food.			
	1st April to 31st July, 1937.	August, 1937.	1st April to 31st July, 1937.	August, 1937.	Return Above Cost of Food for August, 1937.	Total Return Above Cost of Food, 1st April to 31st August, 1937.
	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.
A	12 0 9	3 7 11	4 10 3	1 3 5	2 4 6	9 15 0
B	10 12 9	3 4 4	4 8 9	1 2 11	2 1 5	8 5 5
C	10 10 9	3 3 5	4 11 0	1 2 8	2 0 9	8 0 6
D	7 8 1	2 19 1	4 11 0	1 3 11	1 15 2	4 12 3
E	9 5 5	2 19 1	4 10 7	1 3 0	1 16 1	6 10 11

Production and Exports.

The production of butter and cheese for July, 1937, was:—Butter, 1,258,082lbs.; cheese, 721,222lbs.

Meat exports (figures taken from statistics supplied by the Australian Meat Board)—

	Total Australian Exports for July, 1937.
	Carcasses.
Mutton	46,707 (S. Aus., nil)
Lamb	60,951 (S. Aus., 178)
Pig meat	26,662 (S. Aus., 190).
	Cwts.
Chilled beef	81,424 (S. Aus., nil)
Frozen beef and veal	317,031 (S. Aus., 167)

Agricultural Bureau of South Australia

Southern Bureaux Conference

Representatives of the Southern District Bureaux held their Annual Conference at Milang on 19th August, an excellent attendance of delegates being present from Ashborne, Finniss, Mount Compass, Strathalbyn, Milang, Port Elliott, Belvidere, Narrung, Hartley, Echunga, and Currency Creek.

Mr. L. Young, Chairman of the Milang Branch, presided, and Mr. A. J. Cooke, of the Advisory Board of Agriculture, delivered the opening address.

The following papers were read:—"Wheat Farming," Mr. J. McCarthy (Milang); "The Progeny Test and the Necessity for its Application," Mr. J. Thomson (Milang); "Budding and Grafting," Mr. G. Yelland (Milang); "The Retention of Soil Fertility," Mr. H. H. Pitt (Ashbourne); "Pasture Improvement," Mr. H. Warner (Milang).

Dr. A. R. Callaghan (Principal of the Roseworthy Agricultural College), spoke on "The Relationships of Agricultural Research, Education and Extension." Officers of the Department of Agriculture and Stock and Brands Department took part in the discussions and replied to questions.

Conference carried the following resolution:—"That the 1938 gathering be held at Strathalbyn."

Agricultural Shows

We have been advised by Secretaries of Agricultural Show Societies that their shows will be held on the following dates:—

Orroroo, Wednesday, 6th October.
Streaky Bay, Wednesday, 6th October.
Renmark, Wednesday, 6th October.
Karoonda, Wednesday, 6th October.
Murray Bridge, Thursday, 7th October.
Wanbi, Saturday, 9th October.
Moonta, Saturday, 9th October.
Cleve, Saturday, 9th October.
Blyth, Saturday, 9th October.
Jamestown, Wednesday, 13th October.
Strathalbyn, Wednesday, 13th October.
Tarlee, Wednesday, 13th October.
Penola, Wednesday, 13th October.
Colton, Wednesday, 13th October.
Loxton, Wednesday, 13th October.
Kimba, Wednesday, 13th October.
Brown's Well (Paruna), Saturday, 16th October.
Kingston, Saturday, 16th October.
Mannum, Saturday, 16th October.
Pinnaroo, Wednesday, 20th October.
Maitland, Wednesday, 20th October.
Mount Gambier, Wednesday and Thursday, 20th and 21st October.
Willunga, Thursday, 21st October.
Clare, Saturday, 23rd October.
Port Elliot, Saturday, 23rd October.
Minlaton, Wednesday, 27th October.
Tatiara (Bordertown), Wednesday and Thursday, 27th and 28th October.
Millicent, Saturday, 30th October.
Burra, Saturday, 30th October.
Yankalilla, Saturday, 30th October.
Mount Barker, Saturday, 6th November.
Woodside, Saturday, 13th November.
Kalangadoo, Saturday, 13th November.
Mundalla, Wednesday, 9th March, 1938.
Mount Pleasant, Thursday, 17th March, 1938.

Burr Clover, Subterranean Clover, and Lucerne.

FEEDING VALUES.

Mr. R. C. Scott (Chief Agricultural Adviser), replying to the Secretary of the Lipson Branch of the Agricultural Bureau, who asked for the analysis of Burr Clover, Lucerne and Subterranean Clover, says, "The analyses of the fodders mentioned are as follows:—

	Protein.	Carbo-hydrate.	Fat.	Ash.	Fibre.	Water.
Burr Clover	4.25	6.6	1.05	2.8	3.6	81.7
Lucerne	4.8	8.1	1.1	3.1	5.3	77.6
Early Subterranean Clover ..	2.6	6.6	0.75	8.75	3.2	78.1

The analysis of Early Subterranean Clover has been included, as this would be the type comparable with Burr Clover so far as suitability to the district is concerned.

The above figures show Lucerne to be richest in all constituents with the Subterranean Clover lower in protein than either of Burr Clover or Lucerne."

"Pink Eye" in Sheep.

Green Patch Agricultural Bureau asks for treatment for the control of the complaint in sheep commonly known as "Pink Eye." Replying to this question, Mr. R. H. F. Macindoe, B.V.Sc., M.R.C.V.S., of the Stock and Brands Department, says:—"Pink eye," or contagious ophthalmia of sheep, as the second name implies, is a contagious disease, and readily spreads to other sheep. There are three stages of development:—

1. Slight reddening of the eye accompanied by a clear watery discharge.
2. Formation of a film across the eyes which at first is red, changing to a white opaqueness, which covers the whole of the pupil.
3. An abscess forms in the centre and bursts, and then the condition rapidly clears up, leaving only a very small scar.

The first thing to do when the disease makes its appearance is to separate affected sheep from the unaffected sheep. Affected sheep should be placed in a shady paddock, containing plenty of feed and a good water supply, and disturb them as little as possible. The affected sheep will recover without any medicinal treatment, and the mortality is nil, except through accidental causes, such as running into the fence or over the edge of cliffs, creek beds, &c., and it is very questionable whether it pays to round up the sheep two or three times a week to apply eye lotions or ointments. This is a question which must be decided by the owner.

The following lotions or ointments may be used:—(1) Zinc sulphate, 1 dessertspoonful; boiled water, ½ pint. Three or four drops to be dropped on to affected eyes three or four times a week. On the appearance of the complaint, after separating the flock into two groups, affected and non-affected, both groups should be given drops; or (2) yellow oxide of mercury ointment, 1 per cent. strength. A piece the size of a small pea should be placed between the eyelids, and then gently smeared over the eye by manipulating the eyelids. Should be done two or three times a week.

The three lambs mentioned as being blind, though the eyes look quite clear, are not affected by contagious ophthalmia, but it is due to some nerve changes. This can occur through sheep eating paddy melons or by ewes nursing lambs, &c. If the ewes have been eating paddy melons and develop the trouble there is no cure, but where ewes are nursing lambs they will recover their sight if the lambs can be weaned and the ewes put on to good nourishing food.

Advisory Board

The monthly meeting of the Advisory Board of Agriculture was held at the Parafield Poultry Station on Wednesday, 25th August, on the invitation of the Director of Agriculture. This was the first meeting that the Board had held at the Parafield Poultry Station, and members took the opportunity of inspecting the stock, the buildings, and equipment, including the modern incubator and brooder accommodation and the different styles of houses for the adult stock. Mr. C. F. Anderson (Chief Poultry Adviser) who conducted the party, also outlined the various experiments that were being carried on at the Station.

Members Present.—Messrs. S. Shepherd (Vice Chairman), F. Coleman, P. J. Baily, H. N. Wicks, A. J. Cooke, Hon. A. L. McEwin, M.L.C., A. J. A. Koch, R. H. Martin, A. M. Dawkins, W. J. Spafford (Director of Agriculture), Prof. A. J. Perkins, and H. C. Pritchard (Secretary). Apologies were received from Dr. A. E. V. Richardson, Messrs. Geo. Jeffrey, and C. A. Loxton.

Acknowledgment.—An acknowledgment was received from Sir Wallace Sandford of the Board's letter of congratulation.

Branches Closed.—Owing to lack of interest the Board decided to close the Penneshaw and Boolgun Branches.

Life Members.—Approval was given for the following names to be added to the roll of Life Members:—Messrs. W. P. Woolcock, Longwood; R. H. A. Lewis, Longwood; A. F. Young and S. A. Bone, Pinnaroo; A. A. Jericho, Balumbah; E. H. Pym, Blackheath; W. E. Noles, Mypolonga.

New Members.—The following names were added to the rolls of existing Branches:—Barmera—A. M. Stoeckel, W. Vasey, J. Van Velsen, G. Roderick, N. O. Rodgers, T. E. Caddy, G. Manning, W. P. Corfield, A. T. Coates, J. Fewster, I. F. Hill; Belalie Women's—Miss Joan Frost, Mrs. T. Chambers, Mrs. — Gasstner, Mrs. J. Ross, Mrs. C. V. Collins, Mrs. E. S. Cooper, Miss Eva Cooper, Miss Dora Cummings, Mrs. Jas. Cummings; Berri—C. E. Jungfer, E. J. Welby; Blackheath—R. Pym; Blackwood—R. Cowley, C. Sandow; Brentwood—Les. Watters; Brimpton Lake —A. Henke, L. Henke, R. Whitstone, O. Howell, A. W. Couston; Booleroo Centre—R. O. Nottle, T. H. Stephens, R. H. Llewellyn; Bundaleer Springs — J. B. Molineux, R. Cooper; Cambrai — H. Jeffrey, H., P. H. Grieger, H. Atkinson; Chandada—Joseph Lynch, Jas. Chewings, Wm. Higgins, Vincent Carey; Clare Women's—Mrs. John Berryman, Miss Laura Davey, Mrs. E. C. Jarvis, Mrs. Walter Hawker, Miss Una Scott, Mrs. Tom French; Devlin's Pound Women's—Miss O. Kirby, Mrs. Nolan; Devlin's Pound—J. H. Schultz, C. W. Schultz, R. H. Bawden, E. J. Loffler, A. R. South, R. E. Geue, L. Mackay; Dudley—A. G. Spackman, Ralph Telfer; Eurelia Women's—Mrs. D. Rasheed; Frayville—W. G. Quast, R. O. Ramm; Hartley—Frank Pope, Wm. Angus Richardson; Goode—H. B. Linge, W. Bubner; Hanson—W. J. Woollacott, W. Woollacott (jun.), R. W. Humphrys, M. R. Humphrys, J. R. White; Hope Forest Women's—Mrs. B. M. Dodd, Mrs. G. Hurst, Mrs. G. DeCaux, Mrs. M. Watson; Kalangadoo—D. C. Cowell, J. Mitchell, C. Millowick; Keyneton — R. Kluge, R. Burton, S. G. McKenzie, J. Parbs, S. A. Parbs, F. H. Graetz, H. W. Graetz, P. A. Henschke, L. B. Henschke, L. E. Henschke, C. E. Hausler, O. E. Auricht, F. Garden; Kilkerran—D. S. Jones; Koolunga Women's—Mrs. Bain Cooper, Miss Beryl Glasson, Mrs. E. Glasson; Koonunga — Alwin Heintze; Kyancutta, Keith Holman (jun.); Lenswood and Forest Range—V. Waters, K. R. Burdett, N. L. Cranwell; Lipson—K. Trigg, M. Carr, A. Carr, Albert Baillie, E. G. Darling, R. Rogers; Lobethal Women's—Mrs. — Steen, Miss M. Calman, Mrs. W. Boerth, Mrs. P. Kerber, Miss Edna Kerber, Miss M. Erdmann, Mrs. A. Erdmann, Mrs. A. Camens; McLaren Flat Women's—Mrs. J. Maidment, Mrs. R. J. Deane, Mrs. F. B. Wilson; Monarto South —Ronald A. Altmann; Mudamuckla Women's—Mrs. C. Keitel; Murraminga—John Cyril Williams; Murray Bridge—E. F. Spackman, E. T. Spackman, L. E.

Spackman, M. Ryan, F. J. Lonergan, M. Lonergan; Mypolonga—R. McKerlie, H. Vogt, H. E. Prosser, A. E. Milde, D. Haynes, D. Hill; Nunjikompita—E. McCracken; Nunkeri—Chas. D. French; Parilla—C. J. Hancock; Penwortham—Jas. W. Ross, John Rucioch, Lance A. K. Eaton, John Eaten; Pinnaroo—Aug. Fischer, Len. C. Fischer, C. Klien; Poochera—Geo. B. Bockelberg, Lance M. Joy, Edward L. Beck; Pygery—Claude H. Gosling; Ramco—E. Boehm; Red Hill—Peter H. Miller; Robe—A. L. Hately, F. H. England, H. Denny, W. P. Cormack, R. Wookey, W. Bermingham; Roberts and Verran—B. W. K. Hayward, K. V. Pahl, W. A. Whittaker, Cecil Collins, G. Brereton, D. Brereton, L. V. Pobke; Saddleworth Women's—Mrs. E. I. Stace, Mrs. G. E. Coad, Mrs. M. J. Cole; Snowtown Women's—Miss M. Johnson, Mrs. C. H. Eyre, Mrs. A. R. Bieske, Mrs. T. W. Lee; South Kilkerran—A. Jensen; Strathalbyn Women's—Mrs. — Childs, Mrs. R. Roland, Mrs. C. McMillan, Miss D. McMillan, Mrs. S. Sykes; Tantanoola Women's—Miss J. Telfer, Miss M. Telfer, Mrs. J. Rivett; Waikerie—K. Dunstan, A. Hall, F. R. Francis, F. G. Rainey, W. G. Rainey, J. M. Lambert, W. J. Harden, B. Harden, R. Andrew, J. Andrew; Whyalla—Allan H. Agars, Roland H. Agars; Weavers—W. Jolly, Max Eichner, A. E. Anderson; Wilmington Women's—Mrs. F. Stimpson, Miss D. Stimpson, Mrs. D. K. Northey, Mrs. G. Reeves, Mrs. Hurtle Duhring, Mrs. H. Schuppan, Miss L. Duhring, Miss M. Brown, Mrs. C. Petney.

Various items submitted by Conferences and Branches were dealt with.

Fallowing and Subsequent Workings.

[A. SAWADE (Kilkerran).]

The practice of fallowing has become very popular in South Australia, and nowhere more so than on Yorke's Peninsula. Why do we fallow? We fallow because we know from experience that crops grown on fallowed land yield better than those grown on unfallowed land. The reason why fallowed land yields heavier is moisture conservation and soil aeration, each as important as the other. If we therefore intend to give these two factors their utmost chance to do their job, it stands to reason that we must fallow as early in the season as we possibly can. The ideal time is to continue with the fallowing as soon as the seeding is done so that most of the ploughing is done in June, or at the latest, mid-July.

The plough is the best implement that we have at the present time for fallowing. The plough has not the tendency to leave the job as fine as the cultivator; also it leaves the soil more open to the action of the air, which means better aeration. It allows the rain to penetrate better. Plough fallow has not that tendency to cake as have fallows which are turned with the cultivator.

It is a good plan to do some fallowing before seeding, in early autumn, that is if the ground is not too hard, or if suitable rain falls. This autumn fallow should preferably be done with a disc plough, as this type of plough, if properly adjusted, leaves the soil even more open than the share plough. Autumn fallow has the added advantage of giving a good weed seed germination early, thus giving the opportunity of killing off all the weeds, with a better chance of a clean crop the next year, and making it possible to start seeding earlier than is possible on later fallows. Care in every instance should be taken that the plough is properly adjusted. Very deep fallowing is not desirable in this district—3in. is ample. The next step would be the subsequent workings. Here no hard and fast rule can be made as to the time when this should be done. The fallow should be allowed to remain in the rough state as long as possible, 6 to 8 weeks if possible. Then the harrows should be used. Twice over is better than once. After that the next working may be done with the cultivator. The number of and the times of the subsequent workings would be determined by the weed growth and the rainfall, as it is necessary to work after every heavy fall of rain.

Over the summer period it is best to have the fallow worked up with the cultivator, leaving the land well ridged. This is a great preventive of erosion, both by wind and water.

Rainfall Table

The following figures, from data supplied by the Commonwealth Meteorological Department, show the rainfall of the subjoined stations for the month and to the end of August, 1937; also the average precipitation for August, and the average annual rainfall.

Station.	For Aug., 1937.	Av'ge. for Aug.	To end Aug., 1937.	Av'ge. Annual Rainfall.
Far North and Upper North.				
Oodnadatta	0·53	0·19	9·06	4·60
Marree	0·20	0·36	2·88	5·80
Farina	0·42	0·40	4·04	6·37
Copley	0·86	0·62	4·91	7·76
Beltana	1·26	0·64	6·22	8·39
Blinman	1·24	1·06	8·85	11·71
Hookina	1·59	1·12	8·30	10·94
Hawker	1·92	1·38	11·23	12·09
Wilson	2·04	1·20	10·23	11·65
Gordon	1·81	1·04	9·38	10·33
Quorn	2·84	1·68	12·87	13·10
Port Augusta	2·73	0·89	9·08	9·40
Bruce	2·43	1·06	11·09	9·74
Hammond	2·46	1·24	10·16	11·05
Wilmington	4·07	2·12	15·95	17·18
Willowie	2·66	1·37	10·31	12·10
Melrose	4·16	2·74	17·05	22·80
Booleroo Centre	3·17	1·83	12·52	15·14
Port Germein	2·57	1·36	10·70	12·51
Wirrabara	3·81	2·42	17·94	19·22
Appila	2·53	1·71	12·16	14·59
Cradock	1·70	1·10	9·77	10·67
Carrieton	2·44	1·45	9·67	12·11
Johnburg	2·65	1·20	11·48	10·49
Eurelia	2·58	1·57	10·55	12·66
Orroroo	2·77	1·55	11·59	13·12
Nackara	3·12	1·12	12·52	11·09
Black Rock	2·49	1·45	9·46	12·26
Oodlawirra	2·91	1·27	11·22	11·34
Peterborough	2·20	1·52	8·61	13·14
Yongala	2·95	1·80	11·63	14·37
North-East.				
Yunta	1·36	0·71	10·75	8·44
Waukaringa	1·16	0·71	8·83	7·82
Mannahill	0·66	0·70	8·89	8·08
Cockburn	1·44	0·63	8·57	7·81
Broken Hill	1·48	0·79	7·36	9·40
Lower North.				
Port Pirie	3·11	1·39	11·52	13·18
Port Broughton	2·69	1·65	12·17	13·87
Bute	3·41	1·93	12·39	15·42
Laura	2·91	2·18	12·42	17·93
Caltowie	3·10	2·09	12·17	16·69
Jamestown	2·96	2·24	13·52	17·68
Gladstone	2·82	2·01	11·61	16 31
Crystal Brook	3·46	1·93	13·42	15·79
Georgetown	2·51	2·23	11·44	18·24
Narridy	3·22	1·95	13·42	15·74
Red Hill	3·77	2·18	14·05	16·55
Spalding	3·27	2·43	12·25	18·68
Gulnare	3·45	2·42	13·39	18·51
Yacka	3·62	2·01	12·10	15·38
Koolunga	3·13	1·98	10·79	15·29
Snowtown	3·05	2·09	12·81	15·69
Lower North—*continued.*				
Brinkworth	3·80	2·05	13·32	15·72
Blyth	4·00	2·02	14·25	16·73
Clare	5·30	3·05	20·31	24·43
Mintaro	5·76	3·29	18·57	23·30
Watervale	5·20	3·61	21·03	26·69
Auburn	4·81	3·03	16·92	23·92
Hoyleton	4·46	2·15	14·76	17·25
Balaklava	3·04	1·81	14·39	15·41
Port Wakefield	3·15	1·46	12·59	12·93
Terowie	2·97	1·62	11·30	13·27
Whyte-Yarcowie	2·30	1·61	11·57	13 54
Hallett	3·12	2·15	13·43	16·39
Mount Bryan	3·71	2·26	14·17	16·76
Kooringa	4·52	2·19	14·51	17·78
Farrell's Flat	4·23	2·52	15·70	18·52
West of Murray Range.				
Manoora	4·74	2·56	14·48	18·91
Saddleworth	3·98	2·48	16·32	19·56
Marrabel	3·58	2·74	15·78	19·91
Riverton	3·72	2·72	16·32	20·79
Tarlee	3·38	2·27	12·88	18·06
Stockport	3·35	2·09	13·05	17·02
Hamley Bridge	2·92	1·96	12·01	16·52
Kapunda	2·94	2·45	11·90	19·74
Freeling	2·65	2·25	10·04	17·79
Greenock	2·90	2·83	11·84	21·47
Truro	3·26	2·61	12·04	19·75
Stockwell	2·94	2·57	11·43	20·02
Nuriootpa	3 26	2·72	13·57	20·74
Angaston	2·84	2·93	14·31	22·33
Tanunda	3·07	2·82	13·18	21·97
Lyndoch	3·49	3·13	14·08	23·28
Williamstown	4·53	3·77	17·23	27·54
Adelaide Plains				
Owen	3·78	1·81	15·09	14·78
Mallala	2·97	1·92	10·33	16·43
Roseworthy	3·28	2·16	10·27	17·43
Gawler	3·18	2·25	12·29	18·85
Two Wells	2·77	1·83	10·46	15·80
Virginia	3·00	2·11	12·72	17·22
Smithfield	3·20	2·24	14·32	17·68
Salisbury	3·49	2·30	13·95	18·55
Adelaide	3·40	2·54	15·94	21·17
Glen Osmond	3·84	3·22	18·05	25·96
Magill	3·96	3·13	18·48	25·37
Mount Lofty Ranges				
Teatree Gully	4·52	3·41	18·85	27·03
Stirling West	6·94	6·30	32·51	47·01
Uraidla	7·27	5·82	30·20	43·83
Clarendon	4·49	4·26	21·77	32·81
Happy Valley Res.	3·18	—	17·22	—
Morphett Vale	3·40	2·74	17·94	22·62
Noarlunga	3·32	2·47	16·46	20·35
Willunga	3·05	3·19	15·92	25·96
Aldinga	2·21	2·46	14·62	20·21

RAINFALL—*continued.*

Station.	For Aug., 1937.	Av'ge. for Aug..	To end Aug., 1937.	Av'ge. Annual Rain-fall.
MOUNT LOFTY RANGES—*continued.*				
Myponga	4·14	3·66	20·26	29·72
Inman Valley	3·49	—	18·83	—
Yankalilla	3·13	2·75	16·29	22·78
Mount Compass	3·74	4·32	19·85	36·25
Mount Pleasant	4·87	3·60	16·01	27·08
Birdwood	5·60	4·01	18·73	29·02
Gumeracha	5·75	4·57	22·10	33·28
Millbrook Reservoir	6·57	4·87	25·12	34·50
Lobethal	6·78	5·02	25·55	35·94
Woodside	6·20	4·42	21·09	32·16
Hahndorf	5·19	4·79	20·74	34·82
Nairne	4·85	3·58	17·12	28·14
Mount Barker	4·78	4·15	18·41	31·24
Echunga	5·20	4·28	21·28	33·30
Macclesfield	4·00	3·87	16·42	30·37
Meadows	4·61	4·56	22·21	36·02
Strathalbyn	2·59	2·34	12·34	19·34
MURRAY FLATS AND VALLEY.				
Meningie	2·01	2·17	11·03	18·29
Milang	1·87	1·68	8·84	14·85
Langhorne's Creek	2·53	1·73	9·90	14·93
Wellington	1·98	1·65	9·50	14·66
Tailem Bend	2·69	1·70	10·27	15·07
Murray Bridge	1·62	1·46	6·87	13·49
Callington	1·84	1·82	7·72	15·14
Mannum	2·14	1·26	8·51	11·49
Palmer	3·04	2·05	11·42	15·63
Sedan	1·89	1·50	9·04	12·01
Swan Reach	2·19	1·14	8·06	10·62
Blanchetown	2·34	1·10	7·70	10·95
Eudunda	2·60	2·23	11·57	17·13
Point Pass	3·16	2·53	13·66	16·66
Sutherlands	2·47	1·32	11·92	10·71
Morgan	1·76	0·93	8·32	9·10
Waikerie	1·69	1·03	7·72	9·59
Overland Corner	1·99	0·97	7·22	10·18
Loxton	1·89	1·29	6·78	11·34
Berri	1·78	1·19	7·88	10·03
Renmark	1·33	1·06	8·27	10·33
WEST OF SPENCER'S GULF.				
Eucla	0·56	0·95	5·66	10·08
Nullarbor	0·62	0·97	4·09	8·87
Fowler's Bay	1·56	1·46	6·98	11·93
Penong	1·93	1·64	8·28	12·28
Koonibba	1·97	1·73	8·79	12·18
Denial Bay	2·12	1·58	8·32	11·33
Ceduna	1·83	1·38	6·41	10·32
Smoky Bay	1·95	1·43	7·63	10·50
Wirrulla	1·93	1·61	10·76	10·87
Streaky Bay	3·19	2·01	10·96	14·91
Chandada	3·15	2·10	10·27	12.66
Minnippa	2·20	1·95	9·54	13·97
Kyancutta	2·33	1·85	8·28	13·45
Talia	2·54	2·22	11·56	14·76
Port Elliston	3·53	2·33	12·70	16·53
Lock	2·22	2·60	10·21	16·44
Mount Hope	2·71	—	16·58	—
Yeelanna	1·87	2·45	11·52	16·11
Cummins	2·42	2·75	13·57	17·70
Port Lincoln	1·88	2·67	11·65	19·35
Tumby	1·28	1·79	7·52	14·29
Ungarra	1·77	2·26	10·88	16·94
Port Neil	1·44	1·53	6·37	13·16
WEST OF SPENCER'S GULF—*continued.*				
Arno Bay	1·14	1·48	7·38	12·82
Rudall	2·07	1·70	9·00	13·23
Cleve	1·54	1·82	9·02	14·96
Cowell	0·77	1·12	5·83	11·06
Miltalie	1·60	1·53	11·28	13·75
Mangalo	1·53	1·76	7·48	13·86
Darke's Peak	2·05	2·23	11·33	15·24
Kimba	1·40	1·59	7·45	11·84
YORKE PENINSULA.				
Wallaroo	1·79	1·56	9·99	13·97
Kadina	2·04	1·88	12·17	15·59
Moonta	1·50	1·70	9·61	15·04
Paskeville	2·49	2·09	11·24	15·44
Maitland	2·48	2·55	13·18	19·86
Ardrossan	2·28	1·78	11·26	13·96
Port Victoria	1·74	1·89	10·60	15·39
Curramulka	2·35	2·32	11·59	17·81
Minlaton	2·64	2·38	11·42	17·72
Port Vincent	2·21	1·82	8·88	14·37
Brentwood	2·57	2·01	13·12	15·61
Stansbury	2·52	2·17	10·63	16·81
Warooka	2·24	2·39	11·26	17·44
Yorketown	2·85	2·23	11·08	16·88
Edithburgh	2·35	2·06	9·56	16·38
SOUTH AND SOUTH-EAST.				
Cape Borda	3·44	3·46	19·95	24·87
Kingscote	2·55	2·54	13·43	19·27
Penneshaw	3·03	2·60	13·66	19·18
Victor Harbour	2·16	2·55	15·43	21·43
Port Elliot	2·58	2·36	13·88	19·94
Goolwa	2·63	2·05	13·84	17·84
Maggea	1·92	1·21	7·68	10·02
Copeville	2·48	1·34	8·91	11·51
Claypans	2·36	1·38	9·30	10·53
Meribah	1·39	1·02	6·37	11·11
Alawoona	2·22	1·13	8·16	10·26
Caliph	2·30	1·46	9·13	10·44
Mindarie	2·76	1·51	8·84	12·13
Sandalwood	2·47	1·69	8·94	13·60
Karoonda	2·42	1·86	8·86	14·18
Pinnaroo	1·84	1·66	6·97	14·19
Parilla	2·56	1·68	8·49	13·64
Lameroo	2·68	1·86	8·74	15·79
Parrakie	2·28	1·93	8·67	14·61
Geranium	1·92	2·19	9·18	16·39
Peake	2·64	2·02	10·58	15·95
Cooke's Plains	2·91	1·84	10·85	15·29
Coomandook	2·68	2·11	10·38	17·03
Coonalpyn	3·22	2·14	11·54	17·65
Tintinara	2·69	2·23	11·27	18·72
Keith	3·19	2·19	11·81	17·96
Bordertown	3·03	2·23	11·97	19·14
Wolseley	2·98	2·25	11·23	18·47
Frances	3·07	2·52	11·37	20·12
Naracoorte	3·59	2·79	13·58	22·65
Penola	2·61	3·34	13·77	25·94
Lucindale	3·45	3·07	17·14	23·47
Kingston	3·38	3·11	12·93	24·24
Robe	3·75	3·30	17·46	24·65
Beachport	3·60	3·56	16·67	27·07
Millicent	3·76	3·91	19·27	29·87
Kalangadoo	3·25	4·22	17·22	32·05
Mount Gambier	2·95	3·89	13·20	30·34

Agricultural Bureau of South Australia

Reports Received from Branches.

The following is a list of the Branch reports received during the month, and shows the date and principal subject of each meeting:—Alma, 3rd August, "Livestock in Relation to Cropping," O. Bowden. Appilla Yarrowie, 6th August, "The Merino Sheep," M. Harvie. Arthurton, 29th July, "Eelworms," O. Bowden. Balaklava, 23rd August, address, O. Bowden. Balumbah, 4th August, address, F. C. Gross. Baroota, 9th August, Conference reports. Beetaloo Valley, 26th July, Conference reports; 16th August, address, J. A. Lyons, M.P. Belvidere, 24th July, address, J. Christian, M.P. Berri, 2nd August, "Frost Prevention," L. A. Maddern. Blackheath, 29th July, annual meeting. Blyth, 28th July, annual meeting. Booborowie, 28th July, "Poultry," M. W. Aird. Booleroo Centre, 30th July, annual meeting. Boor's Plains, 5th August, annual meeting. Brimpton Lake, 15th July, annual meeting; 5th August, "New Zealand Tour," J. Vigar. Butler, 5th August, address, P. V. Provis. Cambrai, 4th August, "Sheep Feeding," O. Brown. Chandada, 5th July, annual meeting. Chilpuddie Rock, 27th July, "Crop Rotations," A Cox. Clarendon, 19th July, "Codling Moth Control Programme," M. G. Basey. Coomandook, 30th July, annual meeting. Coonalpyn, 18th August, "Crop Competitions," R. L. Griffiths. Frayville, 22nd July, "Power Farming," G. W. Faehrmann; 19th August, address, T. Farrell. Glencoe, 3rd August, "A Modern Farm," J. A. Dow. Goode, 21st July, annual meeting. Greenpatch, 22nd July, "Planting Pine Trees," G. Whillas; 19th August, annual meeting. Hanson, 20th July, annual meeting. Hartley, 21st July, annual meeting; 18th August, "New Zealand," R. C. Scott. Hilltown, 3rd August, discussion. Ironbank, 28th July, annual meeting. Jamestown, 19th July, "Home Bacon-Curing," W. E. Symonds. Jervois, 15th July, "Dairy Management," P. H. Suter. Karte, 4th August, "Care of Farm Horses," Eric Atze. Kelly, 21st August, debate with Pinkawillinie Branch, "Horses *v.* Power Farming." Keyneton, 9th August, Question Box. Kilkerran, 19th July, annual meeting, "Soil Erosion," C. Rechner; 16th August, "Fallowing," A. Sawade. Koonunga, 21st July, annual meeting and social; 18th August, Question Box. Koppio, 27th July, annual meeting. Kyancutta, 3rd August, annual meeting. Lameroo, 20th August, discussion. Laura, 4th August, "Hay-making," W. F. Wurst. Light's Pass, 23rd August, address, H. B. Scholz. Lipson, 31st July, "Horses *v.* Tractor," F. Richardson. Marama, 18th August, discussion. McLaren Flat, 19th August, address, J. Wilson. Millicent, annual meeting. Monarto South, 21st August, "Shearing," B. E. Schenscher. Moorook, 12th August, annual meeting. Morchard, 2nd July, address, J. Yeatman. Mount Barker, 26th July, annual meeting, "Sheep on Small Holdings," H. Stephenson, jun. Mount Bryan, 24th July, annual meeting. Murraminga, 7th August, "Horses," W. Kies. Murraytown, 10th July, address, N. Scholz; 31st July, annual meeting; 28th August, "Shearing," P. L. Blesing. Nantawarra, 24th August, "Crutching Sheep," L. G. Belling. Narridy, 9th August, "Farm Poultry," M. W. Aird. Nunjikompita, 22nd July, "Farm Blacksmithing," P. Leustner; 19th August, discussion. Owen, 9th August, "Forage Poisoning," H. Bradley. Paskeville, 17th August, discussion. Penwortham, 4th August, "Bee-keeping," J. Masterman. Poochera, 3rd August, formal. Port Elliot, 19th June, address, Dr. G. Shipway. Pygery, 17th August, address A. R. Kammermann. Quorn, 5th August, address, L. J. Cook. Rameo, 26th July, annual meeting; 16th August, paper, E. Borroughs. Red Hill, 5th August, annual meeting. Riverton, 26th July, "Animal Husbandry," R. J. James. Robe, 20th August, "Meadow Hay," R. Wookey.

Roberts and Verran, 21st July, annual meeting. Rosedale, 24th August, discussion. South Kilkerran, 2nd August, "Farm Poultry," S. W. A. Heinrich. Springton, 4th August, annual meeting. Sutherlands, 5th August, annual meeting, "Sheep Dipping," W. G. Schiller. Taragoro, 22nd July, annual meeting. Truro, 16th August, "Fodder Grasses," H. K. Newell. Ungarra, 9th August, discussion *re* Conference. Waikerie, 29th July, annual meeting; 16th August, discussion, "Frost Alarms." Wallala, 24th July, annual meeting. Wandearah, 27th July, address, J. Crouch; 20th August, address, J. A. Lyons, M.P. Warcowie, 17th July, address, W. J. Spafford; 3rd August, addresses, C. Goddard and L. J. Cook. Warramboo, 5th August, "Farming in the Mallee," P. E. C. Daniel. Weavers, 5th July, "Dairying," H. J. Apps; 9th August, "Scrub Land Experiments," W. G. Agnew. Willowie, 6th August, "Milk Testing," J. H. Johns. Wilmington, 24th August, Conference report. Wolseley, 12th July, annual meeting. Yadnarie, 21st July, annual meeting, "Raising Animals," F. W. Jericho. Yandiah, 13th August, annual meeting.

Papers Read at Conferences

The Progeny Test—Necessity for its Application

[J. THOMSON, Narrung (Milang Conference).]

A study of the history of dairy cattle breeding, reveals that it is only a century and a half ago that the exploitation of dairy products was given serious consideration. There was a little before this time, chiefly by Holland and other favoured parts of Europe, in the form of cheese. Slow transport and lack of refrigeration retarded development until towards the end of last century. The theory expounded that particular cattle have been bred for high milk and butter production for centuries is without foundation, as there never was any reliable means of estimating the production of dairy cattle before the Babcock tester and other quick systems were invented about 1890. In a rough way, information was secured by churning, but there was no adequate system of supervising churning tests. There was also measuring the cream line and skimming. Guenon's escutcheon theory held sway in most dairying countries from about 1850 until the Babcock test proved it to be practically worthless in estimating the ability of dairy cattle to produce. The formation of dairy cattle herd books commencing with the Jersey in 1866, the others following rapidly after, was an honest endeavour on the part of men in those days to control the breeding of dairy cattle so that they would best serve the purpose that was desired of them. Dairy cattle breeders, herd book and otherwise, were very slow in giving the Babcock and other tests serious consideration, and even to this day, less than 50 per cent. of herd book, and much less of ordinary dairy cattle, are being systematically recorded. Old habits of agricultural communities are hard to change. The only reliable method of estimating the ability of any dairy cattle to produce is by records of production that can be given by the breeder or owner. In estimating the ability of the bull to improve ordinary dairy cattle, this is the first essential point to be looked for. It has been demonstrated by the older herd testing units in Australia, that if proper breeding methods are employed, it does not take long for ordinary dairy cattle to become equally productive on an average as herd book cattle. The system of elimination of poor producers, combined with only breeding from the best and using good butterfat-backed bulls, soon reaps its reward, in comparison with the herd book system of registering and using for breeding purposes all of such cattle, whether they be good, mediocre or bad producers.

This increase in production has brought us face to face with a huge problem—how are we to evolve even better dairy cattle? Darwin showed that evolution worked, not how it worked. The most victorious moment in his life was when it flashed upon him that the basis of evolution was variations. All our past work of breeding has been built on these variations or "sports" in the dairy cattle world. The latest knowledge of heredity reveals that such "sports" are decided alterations that chromosomes produce. The first thing we must realise is that we are dealing with material that was made by a chromosome mechanism. If we wish to alter that material, we must look to the variations to do it.

In the dairy cattle world there are cows which have proved their ability to produce a large amount of milk and butterfat over a long life, and bulls which have proved their ability to produce daughters which, while still young, seem to be of the same calibre. It must be remembered that when breeding for high production, the qualities are only evident in the females, therefore, the only true test of a bull is through his female progeny. This is a system which is being adopted by herd testing units in leading dairy countries of the world, and it is now being adopted in this State. By marking calves so that the production inherited from their dams can be reliably obtained, and the milking of these daughters under as near as possible the same conditions as the dams, the transmitting ability of bulls can be fairly accurately estimated. When bulls have been "proved" or termed "safe" to use for cows of particular ability, wise dairymen will use them essentially for the top breeding cows of their herds, while young bulls are being tried with others. It is essential that members of herd testing units whose calves are marked, keep a private herd register, containing a brief description of the cow, her records of production at various ages, date of service, sire of calf, and if a heifer, the number it is marked. At the present time, records of production, which are of vital importance, are kept in too slip-shod a manner and very often destroyed after a month or two. In the Narrung Herd Testing Association an attempt has been made with this particular work to a certain extent in the past. Where bulls that are proved good or safe by their progeny have been found, and the owner has got nearly all his daughters, they have been passed on for the benefit of other members. This might sound a very simple system of breeding, but it is by no means yet infallible. The Professor of Animal Genetics at the University of Edinburgh—A. D. Buchanan-Smith—says: "Our breeds must go forward. This is where science can help. The art of the breeder, the ancient lore laboriously handed down from father to son, can now to a great extent be reduced to class-room terms, and the younger generation can start where the elder left off. In effect, we can think more clearly. It is a complicated story, but some time it will have its repercussions. We may be able to short-circuit the ordinary working of heredity, but that day is not yet. In the meantime, the skill of the breeder, the eye of the artist, an understanding of the principles of heredity, a great deal of cow sense, even more hard work, and an infinite amount of patience are still required."

Retention of Soil Fertility

[H. H. Pitt-Ashbourne (Milang Conference).]

The following rotation has been suggested by the writer from his experience in potato growing, and therefore necessarily applies more particularly to that form of cultivation. Nevertheless, many of the conclusions might be equally applicable to the cultivation of other crops, especially those which require a large amount of nitrogen for their effective maturity and are removed in bulk from the field and not fed off by stock, *e.g.*, maize and vegetable crops.

It is becoming increasingly evident that while mineral fertilisers assist greatly to maintain good crops year after year, they alone will not replace all the constituents which are removed from the soil. The mechanical condition of the soil—and by that is meant the friability, &c.—will deteriorate with successive crops. This deterioration will be more rapid if the crops are heavy ones. In this connection, the press has given prominence to the relationship between humus-depleted soils and erosion. A soil robbed of its organic matter is more easily eroded by wind or water than one full of such organic substance. Hence the plea for diversified farming, with the consequent return to the soil of humus in the way of animal droppings.

Again the limiting factor in many summer crops is water. If this be given by artificial means—irrigation—the yield can be increased two, three or even fourfold. While this is of course desirable, it increases the problem of retaining soil fertility. This can be done in several ways. (1) By adding in the form of artificial manures, some of those elements taken out; (2) by carting on to the ground organic matter in the form of farmyard manure, &c.; (3) by growing crops of peas, &c., to plough in for the benefit of succeeding crops.

In (1) is found the solution to part of the problem. Part of the deficiency can be supplied by the addition of superphosphate. Nitrogenous fertilisers are, however, dearer, and one naturally wonders whether that constituent can be replaced otherwise. Farmyard manure has the virtue of being rich in nitrogen, and it also adds much humus. Farmyard manure is far too valuable to be allowed to accumulate year after year. But, however valuable it may be it, it is not in these days of mechanised transport, obtainable in large quantities, and consequently some other method must be found to build up the organic matter in the soil.

Farmers are familiar with the sight of gardeners who, having delivered vegetables to the markets, return with a load of manure from livery stables. That day is nearly gone. Instead growers are now growing tick beans or field pease to plough in, by which process they achieve the same results. But however effective that method may be, there is a certain waste in turning under a 40 bush. crops of peas if the same result can be achieved without losing the peas.

By making a fairly heavy application of super to a potato crop, there is a sufficient residue to grow an excellent pea crop the following year. This may be harvested, but it is better fed off by lambs or other stock, for by the latter means much of the growth is returned to the soil. The pea crop stimulates the growth of much green stuff, mostly Cape Weed or Rye Grass, which, if allowed to grow without heavy grazing, will provide an excellent body of material to plough in. The decomposition of the green material will provide a great deal of nitrogen, and the decayed grass becomes humus of the best kind.

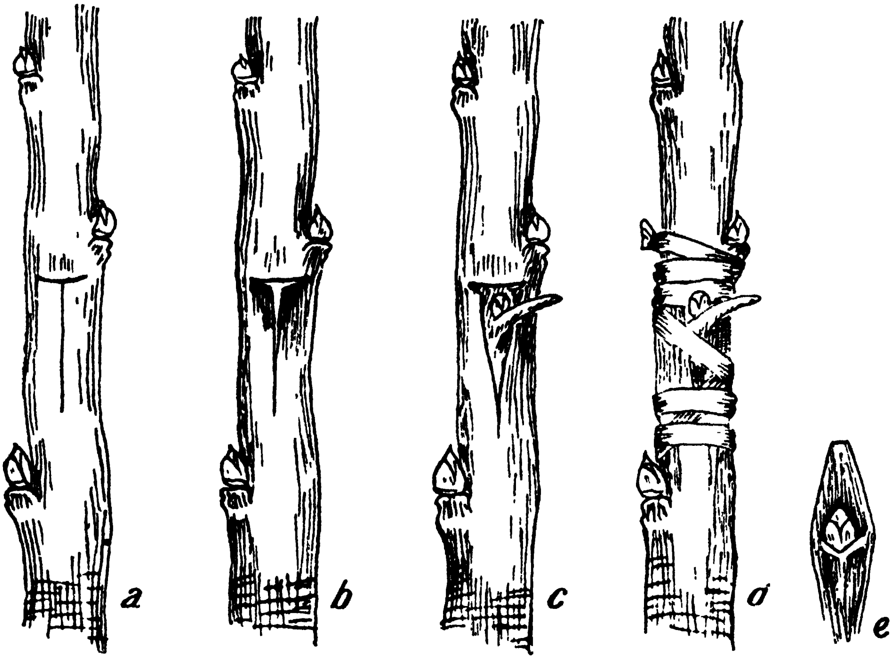
Thus, by judicious management, a crop each year is obtained with some additional grazing, and the fertiliser bill is in the main limited to the cheaper type. Equally important, the soil is not impoverished to the same extent, at any rate of its organic content, as by indiscriminate cropping, and the expectation of high yields over a period of years remains a reasonable conclusion.

Budding and Grafting

[G. W. YELLAND, Milang (Milang Conference).]

In simple terms, any form of plant grafting may be defined as "uniting a scion to a rootstock." A scion may consist of a piece of living bark carrying one bud only, or it may comprise a living twig on which several buds are situated. In technical terms, the former grafting operation is called "budding" and the latter "grafting." The essential difference is that budding is performed while the sap is flowing, and grafting when it is dormant.

The stock consists of a complete root system. Both are comparatively simple operations, provided that reasonable care is taken and the scion and stock are in a succulent and healthy condition. It must be remembered, however, that in uniting a scion with a stock, two separate bodies are brought together, so that if the union is to be permanently satisfactory, there must be the closest botanical relationship existing between the parent plants from which the scion and stock originate. Thus it is a standard practice amongst nurserymen and horticulturists to bud peaches, apricots, almonds, plums, and cherries on to their own stocks. Although it has been found by horticulturists that most of these trees will unite and grow for varying periods of time, that relationship which is so essential for their prolonged union does not appear to exist between most of them. Budding then, is a method of propagating fruit trees used extensively by nurserymen thus assuring that the young tree is true to name and type, and is also used in conjunction with other grafting methods for changing the varieties of full grown trees.



Budding.—(*a*) T-shaped cut in the stock. (*b*) The bark raised ready to receive the bud. (*c*) The bud inserted for tying. (*d*) The job completed. (*e*) A well developed bud.
[From Vic. Dept. of Agric. Bltn. No. 63.

Budding may be performed at any time during the growing period, but autumn budding is most favoured by nurserymen, as the young seedling stock is then large enough and sufficiently matured to take buds. It is also alleged that the autumn bud, which lies dormant until next spring, produces a better tree. In the case of old trees, however, spring budding may be better, for then the bud will commence to grow immediately.

Budding can only be done on comparatively small and succulent growths, say up to 1in. diameter. To secure this in old trees, they must be either entirely stripped of all lateral growth, or stumped back to the main arms the previous winter.

For the actual operation, a sharp knife—preferably a budding knife—and material for binding, such as raffia or strong calico, are necessary. The scion wood is first selected. It must come from proved productive trees, and be a stick of medium size containing well developed buds. On being removed from the tree, it is advisable to remove the leaves, leaving only a short stalk attached to the bud to act as a handle when inserting it. This short stalk also serves to indicate if the bud is successful; if it should come away readily about 10 days after, the operation is successful, but if the reverse is the case, it is not removed so readily. It is also advisable to keep the budwood wrapped in a damp bag to prevent loss of moisture by evaporation, as sunny days are usually prevalent at this time. It is possible to take buds for great distances if these precautions are observed.

The stock is prepared by making two cuts in the bark about 1¼in. in length, in the form of a letter T. To cut out the bud, commence to cut ½in. below it and continue along the stick, taking a thin shaving of wood, emerging above it to make it about 1in. in length. Then this wood is removed by drawing it from top to bottom, taking care not to remove the small socket which fits into the bud; the bark of the stock is raised and the bud inserted. It is then bound securely, but it is necessary to loosen the binding within a fortnight, as the bud will swell. Although it is necessary to remove the wood from the buds of apricot, peach, and cherry, it may remain in the case of apple, pear, plum, and citrus buds.

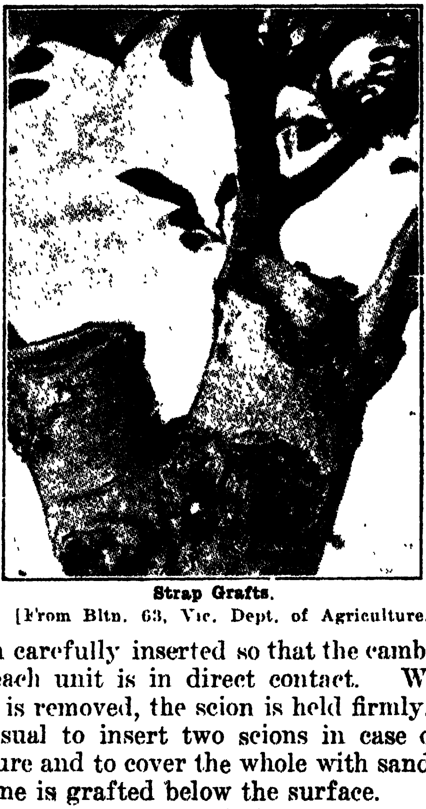
The pruning necessary at the next winter consists in simply cutting off all growth at a position just above the bud. When making large cuts, either in preparing the trees for budding or in shortening back the arms the following winter to where the young shoots arose, it is necessary to dress them either with tar or thick lead paint to exclude the possibility of fungi entering and rotting the wood.

GRAFTING.

The scions for grafting should preferably be left on the trees until the time of grafting, or if this is not possible, buried in white sand and kept damp. Preparation of the stock for the Bark, Cleft, and Strap Grafts consists in stumping the tree back to its main or secondary arms, it being advisable to cut at right angles to their line of growth.

For the Bark Graft, a slit is made in the bark of the stock and the bark eased carefully away. The scion is cut through, making a long oblique section at least 2in. long and cut off from the other end above two well-developed buds. The scion is inserted with the cut section innermost, and the whole bound tightly with grafting wax and tape to exclude air and moisture.

The Cleft Graft is the method commonly used for re-working vines. A split or saw cut is made across the stock and a wedge inserted. The scion is cut in the form of a wedge two inches long or more, with the usual two buds left above it. The scion is then carefully inserted so that the cambium of each unit is in direct contact. When this is removed, the scion is held firmly. It is usual to insert two scions in case of a failure and to cover the whole with sand, as a vine is grafted below the surface.



Strap Grafts.

[From Bltn. 63, Vic. Dept. of Agriculture.

The Strap Graft is designed to overcome the great objections to the above-mentioned methods, because it aids quick healing of the wound so essential to success. The stock is prepared with slits on opposite sides. The scion is a longer stick with a piece entirely removed from the centre, making one extension long enough to go across the diameter of the stock and to tuck 2in. between the bark and wood, while the other extension is as long as the tuck on the opposite side. It is usual to expose the cambium on both sides of the inserted portions. This is undoubtedly the best method of grafting where the stock is not too large. The Whip or Tongue Graft is used for grafting scions to stocks of the same size; however, less than 1in. in diameter. Equal long oblique sections are made in both scion and stock. Slits are then made parallel to the line of growth, starting ½in. from the thin point of scion and stock. They are then placed together neatly and bound tightly.

There are other methods of grafting which do not necessitate cutting back to the main arms. One is called the Peg Graft. To do this, a cut at right angles to the limb is made with a sharp chisel, and a small piece removed. The scion is a wedge which is tapped in lightly with a mallet. With all these methods of grafting, it is essential to use grafting wax and tape freely for success.

However, it is not only necessary to know how to bud and graft, but also to know in what conditions they should be used. It is possible with plum, apricot, and almond trees to stump back to the main arms and either insert grafts or bud into the young shoots which arise from them. Generally, all growth which arises from below the buds or grafts is allowed to grow to restore, as far as is possible, the balance between root and top, and also to shade the trunk. Cherry trees are best grafted in spring, although large wounds only heal slowly, which is a great disadvantage to its permanent success. Generally, buds make very rank growth during the first season, and summer pinching out of the growing tips is necessary to branch them and to ensure that they do not outgrow their hold on the parent branch. Normally budded trees will bear in two years.

Peach trees are not so readily stumped back to the main arms unless they are in a thriving condition, as frequently trees are killed. Apple and pear trees are best grafted by the Peg or some other type of graft which does not necessitate cutting off the arms for a quick return to a profitable condition: or they may be stripped of lateral growth and budded on to the young growth which will arise. In some cases it is best to only cut and graft alternate limbs, and to complete the job the following year.

Although much research has been carried out during the past 10 to 15 years in budding trees on to different varieties of stocks, there is still room for a vast amount to be done under Australian conditions.

Wheat Growing

[H. J. McCarthy, Milang (Milang Conference).]

Farming to-day, from a financial point of view, is very different from what it was 10 to 20 years ago. With the higher cost of fertilisers and cornsacks, higher rates and taxes, advanced land values and interest on mortgages, the present day wheat farmer realises that he is up against a much tougher job, and to make his farm pay he must have some definite and thorough method of working, as it is essential that he must get maximum returns from minimum costs.

Farm Machinery and How to Take Care of It.

Quite a lot might be said under this heading. One must have the right machine for the right locality. The size of the implement should coincide with the amount of work that is expected of it. I suggest for ploughing, a 5-furrow plough for every 150-200 acres to be ploughed. Where there are stumps and stones the stump-jump implement is essential. Where the land is plain and level, the set implement makes a beautiful job. Something here might be said of the disc implement. In sandy and very loamy soils this implement has its advantages, being half as light in draught as the ordinary plough. It makes an excellent job of ploughing, and also makes a splendid cultivator in land that is overgrown with weeds.

For cultivating, many farmers use the combine, and it does excellent work. Some land sets very hard and a combine cannot be used, for it either scratches along the top of the soil or, when pressure is applied, draws in too deeply, because of the set of the tines. In that case, a heavy stump-jump cultivator is the right implement to use.

Harvesting implements should be more or less up-to-date, and in good repair. The knife machine or header has many advantages over the old harvester. It overcomes comb chokes, and one can reap earlier. In damp or cold weather it is often possible to thrash the grain before the ear is ready to strip, and the header makes it possible to get on with harvesting operations more quickly.

Every farmer should take care of his machinery, it is costly and he has to make it last as long as possible. There is nothing worse than trying to work with implements in bad repair, apart from the loss incurred by inefficient work. The successful farmer overhauls and puts away his implements in a good shed when a certain job is done, and they are then ready to take out at a moment's notice.

When actually working an implement, a loose nut will take only a few minutes to tighten, whereas if overlooked, it will probably cause a broken bearing or part, which would be costly to replace, apart from loss of time.

HORSES AND TRACTORS.

A wheat farmer is very dependent on his horses, and he cannot take too great care of them. Feeding with sufficient chaff —matured wheaten or oaten chaff with a fair amount of grain in it—free access to water and warm stables in which to keep them, are essential. At certain times of the year horses need a tonic, and a good plan for this is to keep rock salt in the mangers at all times and then a horse will take its requirements when necessary.

The tractor has become almost universal throughout the farming districts of South Australia, and where they are owner-driven or owner-supervised, they have been successful. So much scientific work has been done of late years on the construction of kerosene-driven and diesel tractors, that it is now possible to procure a machine which is in almost every way superior to the tractors of 10 years ago. A farmer can buy these machines now with much more confidence, and he will do his work more quickly and at the right time, which will probably mean increased yields, and there will be more spare time to devote to side lines.

PREPARATION OF THE LAND.

In order to ensure a good crop it is necessary to fallow, and this operation should be done as early as possible after seeding. The ground should be turned to a depth of from 2in. to 3in. and then left for a time to enable the air to penetrate in order to sweeten the land.

After this has been done, the harrows should be used in order to break any lumps and level the ground in readiness for the cultivator. Harrowing also helps to germinate weeds. Cultivating should be started in early spring when the weeds are in evidence. This job might be said to be the most important in the preparation of land and too much time cannot be spent on it, for in addition to killing weeds, it puts the land into such a condition of friability as to hold the moisture on which the success of the future crop depends.

SELECTION AND TREATMENT OF SEED.

Most districts have two or three particular varieties of wheat that do well for a period and then fall off to a certain extent in yield and quality. This might be due to seasonal variations or actual deterioration in the variety. In selection of wheat the farmer cannot go far wrong in keeping in in touch with wheat breeding institutions, such as Roseworthy College, for experiments are always being carried out to obtain the best varieties possible for the different wheat-growing districts of the State.

Much depends on the the treatment of the seed, and, to ensure an even yield, grading is necessary. It is natural to expect a strong plant from a well-filled, standard-size grain, as the young seedling would have more reserve food material on which to draw. The use of copper carbonate is the most convenient method of pickling, because the wheat can be graded and pickled in the one operation. The disadvantage of this pickle is that it is not a sure cure for smut. Formalin as a pickle is 100 per cent. efficient. This is not widely used, for the wheat must be sown as soon as possible after pickling, and this is at times rather inconvenient. May and June are the recognised seeding months, although in certain seasons early July is not too late. The combine is the ideal implement to use, because it puts the seed on a firm seed bed. As the combine leaves a series of ridges, it is advisable to harrow. This operation also kills any remaining weeds.

If all these operations are carried out with care, a farmer may expect a reasonable crop, always providing the season is normal.

Papers read at Branch Meetings

Eradication of Convolvulus or Bindweed.

Commenting on a plant specimen—submitted by the Yadnarie Branch of the Agricultural Bureau for identification—the Botanist at the Waite Research Institute, Mr. G. H. Clarke, B.Sc., says:—

Eradication by Cultivation.

Convolvulus arvensis, L., known commonly as "Lesser Bindweed," "Field Bindweed," and "Convolvulus," is a perennial plant with a branching system of underground stems and roots which extend down to great depths in the soil. The roots have been known to reach distances of 15-18 feet from the surface of the ground. Like most weeds of similar habit, Convolvulus is well nigh impossible of eradication by the ordinary methods of digging, hoeing, ploughing, and cultivation. Usually the most that is accomplished by these means is a temporary destruction of the aerial growth combined with varying degrees of depletion of the underground parts and reduction in density of the weed growth. Permanent eradication cannot be effected without the complete exhaustion or destruction of the underground system; and, while this may be weakened by repeated cutting down of the tops, experiments have shown that, unless the operation is carried out at regular weekly or fortnightly intervals for a period of at least two years, the stems will remain alive in the ground and capable of producing new aerial shoots.

Eradication by Chemical Weedicides.

An alternative to the method of exhaustion of the plant by repeated cutting down of the tops is to destroy the root system by means of a chemical poison. One of the most effective chemicals for this purpose is *sodium chlorate*, a yellowish-white crystalline substance somewhat resembling coarse table salt. Its action is one of oxidation; it is a strong oxidising agent, and is apt to form explosive mixtures with such substances as sulphur and with organic matter of various kinds. Consequently, there is a definite fire risk attending its use, though it can be handled quite safely so long as common sense precautions are observed. Material which has been sprayed or wetted with chlorate solution becomes highly inflammable when dry, and rubber overalls and boots should always be worn when using sodium chlorate solution as a spray. If clothing or boots should by any chance become wetted with the liquid they should be well washed in clean water before being allowed to dry. On the other hand, sodium chlorate has many advantages when compared with other herbicides; it is very much more effective than most weed-killers, is less poisonous than arsenical compounds, and though it does for a time render the soil unfit for plant growth, its action in this respect is only temporary and passes off after a season or two, especially if the soil is rich in organic matter and receives a reasonable annual rainfall.

Sodium chlorate costs about 60s. per cwt. Whether the substance be applied to the soil, either dry or in solution, or to the foliage of the weed in the form of a spray, for complete and permanent eradication approximately 4-5cwt. of the chlorate will be required for each acre of infested land; so that one may estimate the cost for materials as being in the vicinity of £12-£15 per acre, or between ½d. and 1d. per square yard of weed-covered ground.

A difficulty, as regards chemical methods of eradication, is that it is not easy to destroy the weed without, at the same time, killing most of the other herbage as well. It is a matter for decision, therefore, whether it is worth while sacrificing the existing garden plants in order to get rid of the Convolvulus. While old established garden plants would probably survive the treatment, especially if precautions are taken to prevent the chlorate spray from coming into contact with their leaves, young trees and shrubs are very susceptible to the action of sodium chlorate and would in all probability succumb. But much can be done towards protecting tree growth by exercising care in spraying, by dragging the surface weed growth as far away as possible from the trees, or by using the method of exhaustion by repeated cutting of the top growth on ground in the immediate vicinity of the plants it is desired to protect. Another method is to cover the area within a radius of about six feet from the trunk of the tree with tarred paper (thick brown paper painted with tar and allowed to dry), the paper being firmly weighted or staked down and left in position for about two years.

Application of Sodium Chlorate to the Soil.

The purpose of this method is to attack the root system of the weed per medium of the soil. The chlorate may be used either dry, or in the form of a 10 per cent. solution (1lb. of chlorate dissolved in 1 gallon of water.)

By applying sodium chlorate dry no spray equipment is needed, and the fire risk associated with the handling of solutions of this substance is practically eliminated. On the other hand much larger amounts of the chemical must be used than is the case where the chlorate solution is sprayed on the weeds themselves. But the method has the advantage that it can be used as an initial treatment in the late autumn, whereas the spray treatment is best commenced about November or December when the Convolvulus is coming into flower. Surface weed growth should first of all be removed, and the chlorate then applied to the bare ground in quantities of 1-1½ozs. per square yard. By mixing beforehand with once or twice its volume of clean sand it can be spread more uniformly. The treated area should then be moistened by giving it a very light watering with the hose, using a fine nozzle.

The chlorate can be applied in solution form, but this is apt to be rather wasteful unless the required quantity (½-¾ pint) can be uniformly sprinkled over each square yard. It is difficult to manage this with a watering can, though it can be done by means of a hand spray.

Application of Sodium Chlorate as a Spray.

The treatment in this case aims at destroying the root system indirectly by applying the chlorate solution (10 per cent.) in the form of a fine misty spray to the aerial growth under such conditions as will allow of absorbtion of the chemical by the leaves and its penetration of the root system to varying depths below the ground. The selection of the right conditions for spraying is, therefore, of the greatest importance.

Deep penetration is favoured if the plants are in a partially wilted condition, as, for example, towards the end of a hot summer's day. The soil should be dry, and on no account should spraying be carried out immediately after rain. On the other hand, a shower of rain or a watering after the spray has been applied may assist the action of the chemical.

To avoid excessive evaporation of the chlorate solution and to ensure thorough wetting of the Convolvulus leaves with the liquid, the midday heat should be avoided and the spraying carried out in the late afternoon or evening; if the sky is somewhat overcast and the atmosphere humid so much the better.

A knaysack type of sprayer is the most serviceable, but any sprayer that will deliver a fine mist will suffice. About one gallon of the solution will be needed for each 20-40 square yards depending upon the density of the weed growth.

A first spraying should be given when the plants are beginning to flower, that is, towards the end of November or in December; a second application should be given about 6 or 8 weeks later, and a third 6 or 8 weeks after this, *i.e.*, towards the end of March. This treatment should get rid of most of the Convolvulus, but a small proportion is almost certain to survive, thus necessitating a repetition of the treatment, though on a very much smaller scale, the following season.

The successive applications of chlorate bring about a progressive reduction in density of the weed growth, and the quantity of chlorate solution required becomes less with each successive spraying. In the end it becomes a matter of treating odd plants here and there, and inspection of the ground from time to time is important to ensure that no plants have been missed, and to deal with seedling growth which is most likely to appear during the spring months following the first set of sprayings. Seedling plants are easily destroyed by surface cultivation, but if neglected may re-infest the entire area.

Since continuity of the root system below ground favours the action of the chlorate, working of the ground other than by light surface cultivation should be avoided during progress of the treatment.

If it be desired to commence treatment during late autumn or early winter, an initial application of dry sodium chlorate can be made at once to the soil, and be followed by spray treatments during the following summer.

Crutching Sheep.

[L. G. Belling (Nantawarra).]

Why does the sheepman go to the trouble of crutching his flock; and when is the best time to do the crutching?

This work is mainly done to help keep the flies from striking the sheep. The wool being removed from the crutch, keeps the crutch dry and free from urine. Not only does it help to prevent trouble from flies, but it is of great assistance to the lambing ewe. At the time of crutching each ewe should be cleaned of wool on the udder. This is a great advantage to a young lamb sucking its mother; the udder being free from wool, the lamb has no difficulty in finding the teat and the udder soon dries. Whereas if the wool is left on it remains wet and attracts flies. Ewes should be crutched twice a year—firstly, when the rams are joined and again four to five weeks before they commence lambing. Crutching twice a year gives a better percentage of lambs and one has very little trouble with flies.

Methods.

There are several methods of crutching. Firstly, in the earlier days (and even at the present time) some sheepmen relied on spraying or jetting the flock by means of liquid mixtures containing arsenic sprayed under pressure on to the crutch of the sheep.

This method, although a dirty one for the men doing it, was very successful in keeping down the flies. But in spraying there was always the risk of odd sheep being poisoned by biting themselves. Also it could not be done too close to lambing time, on account of odd lambs obtaining poison when sucking the ewe.

Then crutching was suggested and tried, and then the question arose "Does it pay to crutch?" It pays in more ways than one. It is a cleaner job for the men concerned without the risk of poisoning, and the wool obtained more than pays for the work; whilst in spraying there is not any return afterwards.

When shearing comes we find less stained pieces and locks, thus keeping the price of wool per sheep at a higher average.

Nowadays most people are using the machine for crutching, it is not only quicker than the blades, but it allows a better job to be done.

Several cases have been seen where just each side of the crutch was done, or each side and down the inside of the legs, nothing being taken from over the tail. However, there is only one way of doing the business properly, and that is not to be afraid of taking off too much wool.

Start with the sheep sitting in a comfortable position, taking the wool first from the udder and work down the crutch, and then on the inside of each leg. Then turn the sheep over and go down the outside of the right leg, making sure to keep well around the leg. From there go over the tail 3in. or 4in. up the back and finish on the other leg, making sure to keep well around the inside again. In this way both legs are left clean and the job is neat and even. Wethers in the Lower North should have a little wool taken from around the tails; also around the pizzle. This keeps them dry and free from smell. We know that it is the smell that attracts flies, and once we can get rid of the smell our troubles are diminished.

Finally, sort the pieces taken from the crutching and bail or bag them and brand them "No. 1 and No. 2. Crutchings"—not as "Pieces" or "Stained Pieces."

Preparing the Shed and Shearing.

[B. E. Schenscher (Monarto South).]

Shearing will soon be in full swing. See to it that the shed is ready and all yards mended. Clean the floor, first sweeping out all dust, then give it a good wash. When using water for the last washing add a little Lysol to kill germs. Branding oil is also wanted. Do not use paint, use only the best. Twine may be used for sewing bales, but bale-hooks are much quicker and are not expensive; even when sewing they are handy to hold down the top. When yarding sheep do not chase them too much. That is, do not rush them in to the shed for the shearers to shear when too hot. Let them stand a while to cool.

When starting a sheep, the belly wool is taken off first, whether blades or machines are used. Then shear inside of right hind leg. If sheep are not clean, the left leg should be done also. You can then sharpen your shears and have them cutting well for the rest of the sheep. Then shear up the neck to the ears, clean off neck to shoulder. This is where many make a great mistake by not shearing the shoulder round far enough. That causes many torn fleeces. Then go down the side to the hind leg. This left hind leg should not be cleaned before; by doing so it always means that you are making a blind cut, with most likely half the wool left on. Then shear around the rump, throw the fleece around to the left so that one does not stand on it. When finishing the last side, hold the sheep up straight. By doing so one can see what one is doing. Do not forget to take off all trimmings. You often hear it said, "He shears a good sheep, but does he shear it well?"

Many shearers make the sheep look well but make a terrible mess of the wool. When the fleece is on the table there is a shower of second cuts, which is a waste of good wool. Others do not make them look so well, but cut clean. When sharpening shears, have a good stone, do not press too hard, only apply pressure when going up, and gradually rub from point to heel. Do not pull the shears back too far; it only makes the work harder, and has little advantage.

Shearing.

[P. L. Blesing (Murray Town).]

Shearing is carried out from June to October. This only refers to the plan of shearing once every 12 months. In the last few years some pastoralists have adopted the idea of shearing three times in each two years. In one instance the wool has 12 months to grow, and in the other only eight. Scientists contend that the wool grows more in the first six months than it does in the last.

One sheep-farmer who practises the new plan, claims that he receives 28lbs. in two years from a sheep which only produces 20lbs. under the other plan.

Sheep crutched, say, a month before shearing are much better to handle at shearing time. From the point of view of the shearers they are quicker to get out of the port-hole, for the owner the shearing period is shorter and the wool is kept cleaner. The cost of crutching is hardly noticeable when compared with the benefit derived at shearing time.

The board should be washed before shearing is commenced and at least once a week until shearing is finished. This is one aid to keeping the wool clean. Wool yolk is the only grease that is soluble in water.

Once the sheep leaves the catching pen it is placed on the board in correct position—that is, with the machines, as the length of rods or cables limits the distance the sheep (as the shearing operation progresses) can be moved. With the blades the animal can be placed anywhere near an outlet door.

The belly wool is taken off and the inside of both legs cleaned. With the machines the outside of the near hind leg is cleaned and the forelock taken off. The neck is then opened up and the side of the head with the near-side sheared. The wool is then taken off the back and up the back of the neck. In machine shearing this is called the "long-blow." With the off-side the other side of the head is cleaned and the sheep goes out the door. The broom (one of the most important things in the shed) then comes into action and should be kept in almost constant use.

Shearing is done in different ways by different shearers. For instance some blade shearers leave the belly wool until last, as in lamb shearing, although some owners will not allow this.

The fleece is picked up and thrown on the wool-table which should measure 9ft. by 4½ft. It is a good plan to nail a 6in. board to the legs of the table to prevent the locks from drifting under the pickers' feet. Skirting is then carried out; with sandy sheep the back is taken out and the rest of the fleece is rolled into a neat bundle with the best piece showing. The fleece is classed according to length of staple, strength, quality, condition and colour, therefore, the best wool of the clip is the longest, soundest, finest, lightest and brightest. In the case of the back not having to come out, roll one side two-thirds of the way across then fold again from the same side, turn the neck in and roll from the breech to the shoulder.

The main objects of classing wool are to meet the buyers requirements and to ensure the best competition and so enable the grower to obtain the best possible value for his wool. It must be remembered that when preparing for shearing any such stuff as chaff or hay should be cleaned away, as it is very objectionable in wool.

Power Farming.

[G. W. FAEHRMANN (Frayville).]

When contemplating the purchase of a tractor one should first consider the following points:—

1. Is my financial position such as to warrant the outlay?
2. Is my farm suitable for power farming?
3. Am I prepared to pay careful attention to ensure successful working with a minimum of expenditure for upkeep?
4. Is the type of tractor suitable for the type of farm I intend to work?

Having answered these questions in the affirmative let us consider the arguments in favour of the tractor. There is the ability of the farm to carry a greater number of sheep than when horses are employed; ability to do the work in hand in a shorter period, and to sow a greater portion of the wheat at the right time. This leads to an increased yield. With a tractor it is also possible to fallow, harrow, and cultivate more ground while it is in a moist condition. As this helps to conserve moisture it must be considered a real advantage. Then being able to gather the harvest in less time is important in case of storm. Through being able to do these jobs more quickly the power farmer has more time to devote to other work on the farm, such as attention to stock, noxious weeds, repairs, erection of fences, and he thus employs less labour. Another advantage is the extra amount of leisure enjoyed through not having to feed and care for horses. Horses have to be fed from six to nine months a year.

Against power farming, we are told that the feed used for horses is grown on the farm, and that fuel for the tractor has to be purchased. This is the case, but it must be remembered that the cut for hay has a definite cash value. If 30 acres of crop averaging 21bush. per acre at 3s. per bushel is cut for hay it represents an outlay of £94. With the horse the value of the hay has been taken out before using, but with the tractor the value of the extra grain can be banked and the fuel expenses can be spread over the whole year. It is also said that the tractor has caused a surplus of wheat on the market and is partly the cause of the low prices. No doubt a little extra wheat has been placed on the market, but not enough to make any difference. In 1891 to 1896, before tractors were thought of, wheat was of less value than of recent years. Tractors are said to lead to unemployment of farm labourers, blacksmiths and saddlers. The answer is yes, but these have been absorbed in other channels, such as keepers of oil depots, mechanics, and the extra amount of freight handling for railways and carriers. It is very doubtful if any unemployment is caused. It is quite the usual thing to be told that the high prices for horses are due to farmers going back to horses. Do not be misled; careful observation reveals that not 1 per cent. of horses sold are purchased for that reason. They are purchased by farmers who neglect to breed or are tired of trying to do so. Many farmers look askance at tractors just as they did at super, seed drills, harvesters, and other new and improved methods that have come to stay. After an inquiry, the Wheat Commission, in a statement on the costs between horses and tractors, gave them as equal.

Too much care cannot be given to a tractor. The farmer who is satisfied to work an underfed team with sore shoulders, or one who never worries to replace a broken bolt but simply uses a piece of wire ("farmers friend" as it is sometimes called) will never be a successful power farmer. While a neglected team will keep working for a while, a tractor certainly will not. Thoroughness and cleanliness are absolutely essential. Having used a crawler type of tractor for over seven years, £2 per year would cover actual replacements. On my tractor pins and bushings have never been touched and show very little sign of wear. When these are worn on one side they can be turned and worn on the other side. This confounds the idea that the crawler type of tractor is subject to excessive wear. The tracks on this tractor will easily do 30 years of work, or, in other words, will outlast four or five sets of grips or tyres. The cost per acre for ploughing is approximately 9d., and cultivating or seeding 6d. to 7d. Seven years of power farming has been a profitable investment.

Rearing Farm Animals.

[F. W. Jericho (Yadnarie).]

Farm animals, especially horses and dogs, play an important part on a wheat or sheep farm. A dog should be muzzled when first taken out with sheep; once a dog has bitten he will bite again. Give each dog a name, and call it by that name when feeding; also, when out in the paddock, call the dog back whenever it runs after something. If it will not return immediately, punish the dog, and it will soon understand when and how to come to its owner. To make a sheep dog bark young, rattle stones in a tin. Keep the dog tied up and feed it well, so that it will be anxious for work. A hunting dog should be trained not to attack sheep. If a dog taken off the chain shows signs of biting the sheep when mustering it should be severely punished. Sheep dogs should not catch rabbits until they are fully trained. Fowls may be used for early training; if sheep are used, they should be large, fat wethers, and as large a mob as possible.

Young calves should be fitted with forks as soon as they are let off the chain to prevent them from forming a habit of crawling through fences.

Lambs should be tailed at approximately six weeks and prevented from getting through fences. Young horses should be driven with a word of command for each respective action. If trained young, cows will come to feed and will even come home to the ringing of a cowbell.

Farming in the Mallee.

[P. E. C. Daniel (Warramboo).]

Farmers who have had reasonable returns under normal seasons from scrub blocks should have expectations of substantial increases when the land is older, rotation cropping is practised and water is laid on, by reason of returns from sidelines and sheep on the farm.

It should be the aim of every farmer to make his land old as quickly as possible in order to secure the maximum returns; and in the writer's experience there is only one way to do it—by the use of the mouldboard plough and fallow, the plough pulling out the stumps more readily than the cultivator or disc.

If all the stumps in a paddock were grubbed and laid out as close as possible, it would surprise us to see the acres we waste each year, as these stumps grow neither crop or grass.

The combine has played a great part in the low average return from the Mallee, where new ground keeps clean for a number of years and is sown with wheat year after year, until it is too dirty or ruined by becoming wheat sick and when fallowed or cropped after a spell shows disheartening returns, the farmer being too disgusted to fallow again.

I do not wish it to be thought that I am condemning the combine, this rigid-tyne implement being on its own as far as seeding is concerned, but the point is that it is quite easy for a farmer to sow 600 acres of wheat by an early start using the combine instead of fallowing the older paddocks and following rotation cropping, which should be fallow, wheat, oats, grazing, this being 4-year rotation. The writer would recommend longer if possible. Grass appears to go back after the fourth year, but supered and seeded with oats and Wimmera rye grass it will give good grazing returns for another period of years.

Much has been said about clearing our sandhills, but these when cleared of stumps do not appear to drift to any extent and if supered will grow splendid wheat and feed as they grow older, besides being sure of a hay cut in almost any season.

Fowls and mallee cows can only show they are worth keeping for profit where there is a large family and no outside labour has to be employed.

Pigs have been showing decent returns, but with the increased price of wheat which is necessary to feed to procure maximum profits, small paddocks sown with Cape barley, Wimmera rye grass, peas, &c., are necessary, only feeding wheat to finish them off.

Sheep are not considered under the heading of sidelines. It is impossible for any farmer to state their value on the farm. Besides the annual income of wool and lambs, the droppings must ultimately have a great influence on future crops.

By rotation cropping, following wheat with oats, it should be possible to cut large areas for hay, and we should carry enough sheep to keep down the flush of feed in September, resorting to hand feeding when necessary. The extra sheep carried would show good values for feed used, meaning more average income per year than speculating on cutting hay for sale. Other items which would improve the carrying capacity of our mallee lands are:—Early fallowing to sow with peas, this giving grazing for sheep after the grass is gone and until the stubbles are ready; Sowing of Wimmera rye grass, lucerne, &c., results of which could not, under our rainfall, give intense grazing but should be at least worth trying.

It is certain that if our mallee lands (with water laid on) were sown with wheat only on fallow, the yield per acre would be considerably increased, and by using the stubble crop of oats for hay and ensilage, keeping plenty of reserve fodder on hand, the increased carrying capacity of our farms would soon mean a bigger average income.

Experiments in Scrub Farming.

[W. G. AGNEW (Weavers).]

THE TYPE OF LAND.

Most of our scrub land in this district is either of a sandy nature or very stoney, and it is with the former class that I propose to deal.

Most of the scrub land lying between Minlaton and Stansbury known as the Stansbury scrub is of this nature and in its natural state carries low mallee and broombush, neither of which are very hard to kill. The land varies from very sandy to a sandy clay mixture, but the subsoil is practically all clay—a very important point in favour of developing this country.

DEVELOPMENT.

For many years this land was considerd worthless, and so it is in its natural state. I doubt whether it would carry one sheep to 50 acres. But experience has proved that once it is cleared it becomes quite worth while, both from a grazing and a crop-growing point of view.

This land is quite a problem in the early stages of clearing. Very little of it carries enough scrub to warrant rolling, and even if rolled—which is the most effective method where the mallee is high enough—a good clean burn is rare.

With the modern twin-disc plough, the low scrub can be very well handled without any other treatment at all, and with a good scrub rake the bushes can be raked together and burnt quite well enough if they are left to dry before raking. About 300 acres were treated in this way this year and we had very little trouble to get the combines through the bush when seeding.

CROP ROTATION.

This is quite an interesting problem on this class of soil, and it will be many years before the ideal rotation is arrived at. The experimental rotation we are trying is wheat, peas, grazing, barley, grazing. One of the main things to remember in looking for a suitable rotation is the natural state of the soil which is fairly rich in lime but very poor if not entirely lacking in phosphate and nitrogen, and also devoid of humus. That is the reason for using peas as the first or second crops.

This land is unlikely ever to be very good wheat country, and after the first crop it would be better to concentrate on barley and oats for cereal growing; but a wheat crop as the first crop should be valuable, especially if sown with Wimmera rye grass to provide a good burn to clear up the sticks, &c.

Burning is not the best method of killing shoots. A good ploughing with a twin-disc plough in the late summer is worth two fires as a shoot destroyer.

FODDER PLANTS.

After the shoots are reasonably destroyed, some form of fodder plants should be established, as the first plants to appear, namely, silver and spear grasses, are relatively poor fodder plants.

Wimmera rye grass is the outstanding non-leguminous plant. Some very good fields of this plant are to be observed, and this grass is now well past the experimental stage.

Among the legumes, Burr Medic and King Island Melilot, quickly make their appearance in the natural course of events when the land receives a liberal dressing or two of superphosphate, but some very interesting experiments are going on with Subterranean clovers, both the early and late varieties, and the next few years will tell whether this plant will be valuable in this country or not. The recent statement by the Waite Research Institute that the length of growing period is of more importance than the annual rainfall may mean that this will be a commercial proposition in this class of land.

Other grasses, &c., to show promise are Evening Primrose (especially on the white sandhills), lucerne where there is not too much sand overlying the clay subsoil, and all of our native grasses.

PEAS.

The greatest revelation this land has made is in the way it grows peas. Last year 30 acres were sown and they produced a tremendous crop, of both straw and grain. As the land was too stumpy to harvest, the sheep had to be turned on them, so we were unable to ascertain how much grain per acre they would have returned, but a reliable judge estimated them at 8 bags and said they should fatten 10 sheep per acre.

Sheep turned on peas fatten very quickly if they have free access to water, and they clean up all the pea stubble and leave the land looking like a well-used sheep yard. This treatment should have a very beneficial effect on the land.

TOBACCO.

Another experiment which is attracting some attention on this land is tobacco growing, but it seems to me that not much success will attend this until some means of irrigation is used, as our summer rains are too unreliable to produce good leaf; but experiments have shown that the land is suitable to produce a good light tobacco for the cigarette trade.

The most interesting new experiment taking place this year is the growing of turnips. One neighbour has about 20 acres of these and they are looking extremely well.

In conclusion, this country is well worth developing, but it means hard work and capital. With these two essentials this country should be a quick profit-maker and should, very quickly increase in value, although the methods to obtain the maximum results have yet to be discovered.

Soil Erosion.

[C. RECHNER, Kilkerran.]

Soil erosion in various portions of South Australia has assumed such proportions, that the Government has seen fit to appoint a special body to investigate and report on the subject.

In the pastoral areas in the Far North, soil erosion is caused by the combined effects of low rainfall, overstocking, and the ravages caused by rabbits. The country begins to drift as its natural covering of pasture, herbage, and trees is removed, and when this occurs arid or desert conditions begin to take the upper hand.

In some agricultural areas just inside Goyder's Line of Rainfall, and particularly in mallee areas, soil erosion is also only too apparent. Large areas have become sandy wastes, through too frequent cropping. Fences become buried and farm buildings and other improvements banked up with drift.

The chief causes of soil erosion or drift in the lighter rainfall areas comprising the mallee lands are too frequent cropping, which deprives the soil of its natural cover, and successive stubble fires, which tend to leave the soil in a loose condition and destroy the binding agents of the soil, namely, vegetable matter, which holds sandy and loose soil together. High prices for grain a few years ago encouraged frequent cropping of these areas.

To check drift in such areas, a more judicious rotation of cropping will have to be resorted to. Bare-fallowing of such land will have to be done at less frequent intervals, or dispensed with altogether. Topdressing with rye grass and other sandbinding plants to increase the stock carrying capacity of drifting areas will have to be resorted to.

The longer the pasture period becomes the greater the number of stock that can be carried. This form of rotation will increase the humus of the soil and help it to retain moisture, which assists in decaying vegetable matter. Lucerne will thrive in sandy soils, but it must not be grazed too heavily until it becomes established. In controlling drift, stubble should not be burned but fed down and the stock left to break up the remainder; so that where cropping can safely be carried on cultivators can be used, which tends to leave the straw on top and so prevent drift.

Fortunately in Kilkerran district drift has not caused very much trouble. However, during the dry summers which we have experienced during the last few years, fallows have drifted after heavy showers or thunderstorms, and even the heavy soils have not been immune from drift. Owing to the light crops in parts of our district, fire harrowing had to be resorted to. This has the tendency of making the top soil very fine, and if fallowing is carried out by cultivating instead of using the plough, by the time the fallow is worked back and harrowed several times, the soil becomes very loose. Should heavy rains occur during the summer, the fallow will drift badly. Even where fallowing was carried out with the plough after the use of fire harrows, drift occurred and fallows had to be worked back for no other reason than to prevent further drift.

It seems that the rotation of bare fallow, wheat, barley, while being quite good in preventing what is termed "wheat sick" land, has the disadvantage of keeping the soil in a more or less loose condition; and when such land is bare fallowed drift conditions are pretty sure to obtain in a dry summer.

On the other hand land that is left out to pasture every fourth year, will not give trouble through drift when fallowed. It is a good practice to fallow barley stubble, but it is surprising how quickly the barley straw rots when turned under by the plough, and although this practice has much to commend itself, the four-year rotation is preferable if the soil is to retain its fertility, and withstand conditions giving rise to drift when it is bare fallowed.

There is the problem also of the small holding, which necessitates the carrying out of the three-year rotation, bare fallow, wheat, barley. In such cases, it is very essential to plough in the barley stubble and leave the fallow ridgy before the harvest, instead of having a smooth surface formed by harrows. The use of harrows is one of the best methods of conserving moisture in our fallows, and while their frequent use on fallows that have been worked up from grass land gives no trouble from drift after heavy rains in summer, we will have to limit their use on fallows that have been barley stubbles or wheat stubbles prior to fallowing.

Care of Farm Horses.

[E. ATZE (Karte).]

Horses should be fed first thing in the morning, and whilst feeding should be groomed properly with a good stiff brush and curry comb to remove dirt or scurf. The team should be fed on good oaten chaff, instead of long hay or cocky chaff. While working, horses should be fed three or four times a day; each horse should have just as much feed as it can eat at one feed. If more feed than can be eaten is fed it becomes stale and is injurious to horses. Before being put to hard work after a spell, horses should have a week's stable feed, and should not be worked too heavily for the first few days. If a team is overloaded it will not work satisfactorily. When yoking horses the driver should run his hand over the horses' shoulders to feel for any lumps or bruises. If this were done teamsters probably could prevent sore shoulders. To prevent scalding wash the shoulders, especially those of a young horse, with clean cold water each evening. Collars should be kept clean, special care being taken against old scabs sticking to the collars. If sore shoulders develop, the use of a breastplate is often advisable. Diseases or ailments of any kind should be promptly attended to. The stable should be free from sharp edges or any projections on which horses may be injured. A water trough should be supplied to a stable, as horses often will not have a proper drink when coming in from work. With a trough in the stable they are at liberty to drink at intervals as required. A salt lick should also be supplied. When working the team care should be taken that the swings are wide, to prevent the chains from rubbing against the horses' sides. The farmer's motto should be that one horse too many is better than one horse too few. If that were adopted there would be fewer thin horses and sore shoulders. The team would also be able to work much more quickly. The whip should be used only when absolutely necessary. Horses still hold their own, and will for a few years to come, although many farmers have replaced their teams with tractors. To ensure a good fast team one should breed young horses each year, not break them into harness too young, and feed them on good chaff. It is a good practice to reserve a paddock of greenfeed for the team in the spring time.

A Modern Farm.

[J. A. Dow (Glencoe).]

The average farm is very much behind the times. A big manufacturing firm nearly every year has to make extensive alterations to the plant and methods to keep up with the times. These alterations cost a lot of money, but the firm makes them, knowing the consequence of not doing so. Farmers must keep up with the times, too, and must not be afraid to make alterations to their methods. In starting with a block of land without any improvements the first thing is the ring fence. This in common with all fences on the block must be high. We see so many low fences which are only suitable for sheep. The block must be sub-divided into paddocks of convenient size. Before sub-dividing one must decide where the buildings are to be placed. The old idea was to place the buildings in the centre of the holding, but this position has many disadvantages. The distance to the factory and township will be so much greater, with the result of extra travelling expense and extra time. Another disadvantage is the high cost of metalling the track of land to the road. And again the land that is wasted in this way could be producing. We who pay £30 and upwards per acre for our land must be more careful in planning than the man who has only paid, say, 10s. per acre for his land. Sheds must be conveniently situated to the house and road. Any yards will be so constructed to take up the minimum space. If there is a motor, one should have a ramp alongside the road gate. Time is money with the farmer as with the business man; besides, the convenience is worth the initial outlay. Another thing to be considered is that often when a person is in a hurry he is apt to leave the gate open until coming back, and quite a lot of trouble can be caused by a gate left open.

A Codlin Moth Spray Programme.

[M. G. Basey (Cherry Gardens).]

Paper Read at July Meeting of Clarendon Branch.

A Calyx spray is not necessary. Give the first application when the Apples are well set and the largest about ½in. in diameter. This is generally at the end of October. The second spray is given 10 days after, and is important for 2 reasons: —(1) The first spray seldom covers the whole surface of every fruit and a second spray shortly after covers up the whole of the bare spots; (2) it is very necessary to strike the first brood to cut down the numbers of subsequent broods. The third and subsequent sprays are again given at intervals of 3 weeks in the case of Jonathans and 4 weeks with Yates—making 6 sprays in all or 7 sprays if a calyx spray is given. With varieties that grow larger and more quickly than Jonathans shorten the intervals between applications. The main thing is always to have the *whole* surface of *every fruit covered* with spray all the time. This brings up another point. Some brands of lead stick better than others, and it is a waste of time to use a lead that will not stick. A good way to sample them is to spray beer or lemonade bottles with different brands at standard strength and leave them exposed to the weather. We use 6lb. paste and ½lb. of calcium caseinate spreader to 80galls. of water. Paste is said to stick better than powder and has finer particles.

The factor which is perhaps the most important of all is the thoroughness with which the spraying is done. Most grub losses are caused through inefficient application of the spray, leaving many parts only partly covered or not covered at all. Growers probably think they are doing a good job, but in the rush to get the work done and keep the cost down many fruits are not properly covered. £10 saved in time and material can easily mean a loss of £100 in fruit. For growers whose orchards are badly infested the following programme should be followed for a year. If successful, a normal spray programme should suffice in subsequent years, particularly if the orchard is isolated and not subject to infection from neighbours.

Programme.—In the winter scrape the bark from trees and kill all grubs, taking care to go 2 inches below the ground surface. Bandage trees. Commence with calyx spray, 7lbs. paste and ½lb. spreader to 80galls. water. Continue with this mixture every 10 days for at least 5 applications, and then perhaps every 2 or 3 weeks with 6lbs. paste and ½lb. spreader. If thoroughly done this should clean an orchard. The strong and early applications are recommended to strike the early broods.

The above method has been very successful. One year (a light crop one) there were 40 per cent. of grubs in Jonathans. Twenty-thousand grubs were collected in the bark during the winter and the above programme was put in operation. Since then grub losses have been practically nil —not ¼ per cent. the following year. It was not worth while examining the bandages and they have not been used since 10 years ago.

Rigid Tyne Combine.

[G. D. Butler (Wolseley).]

Although we hailed the spring-tyne combine with delight 18 to 20 years ago, since then we have not advanced very much in seeding technique. When it is remembered that the application of super. became general only about 40 years ago, it is reasonable to assume that it is not too soon to consider another step forward. This appears to be in the direction of better seeding machinery.

Our fallows are equal to the world's best, and so are our harvesting methods. In any case, there is such a long period of good harvesting weather that one can be reasonably sure of reaping the crop, even should the harvester be an antique.

Seeding the Weak Spot.

But seeding is the weak spot in our armour, and the time has come to look to it. The crucial point is the use of the spring-tyne combine. This is an excellent machine where conditions suit it, but it fails lamentably when they do not. One of the chief reasons for our dirty crops is that they are sown too early; and they are sown too early because of the fear that the only seeding machine, the spring-tyne combine, would not deal with the job when the land became a bit wetter, and so packed a little tighter. Let me quote Mr. D. R. Milne: "I find that crops sown about a month after the opening rains are better than those sown earlier." Farmers elsewhere appear to be changing over from the spring-tyne to a stiffer-tyned type of combine. In some districts it was never popular. One firm this year sold over 500 rigid-tyned combines, and could not keep up to the demand.

So it follows that either we are out of date or our land is unsuitable for the rigid tyne. My experiences have convinced me that correct handling of our Wolseley soils emphatically calls for a rigid-tyne combine. I do not advocate the scrapping of the spring-tyne, but rather the addition to the plant of a stiffer-tyned combine. I bought a new rigid-tyne combine in 1931. As my land was not altogether free from stumps, I investigated the possibilities of trip-tyne combines, but came to the conclusion that a little wear in the working parts would put them out of action. This conclusion could not have been entirely unsound, for trip-tyne combines have declined in popularity and, as far as I can gather, only one firm (in New South Wales) is now producing them.

My decision meant a lot of time spent on clearing out stumps and roots and in levelling and draining the land. A certain amount of levelling was necessary, for it was obvious that it was no use delaying seeding until the right time, if by that time the little holes would be filled with water. My new machine was entirely rigid, and it paid for itself twice over in the first year. For the seeding was very wet and the rains were so heavy and frequent that the spring-tooth positively would not do a decent job. I reaped an average of 28 bushels from the land sown with the rigid-tyne, and only 16-17 bushels from the few acres sown with the spring-tyne.

The next year, 1932, was probably more difficult, and the spring-tyne was again able to negotiate a small area only, and this area again grew a poorer crop. These two seasons convinced me that this machine was unsuitable. It had the modern type of long floats, rows 16 inches apart, and I found that in the Bay of Biscay soil, however much it was levelled, when the front tynes were cutting satisfactorily, the back ones would be out of the ground half the time, and vice versa. It was fitted with the knuckle-joint in the floats, but neither this nor any other adjustment would make it work well in all types of soil. I then transferred the rigid-tynes (only) to an old "Sun" combine (1920 model with 11 inches between rows), and the composite machine worked perfectly. It sowed about 30 per cent. of my 1933 crop, 20 per cent. of the 1934 crop (too dry), 40 per cent. in 1935, and 10 per cent. in 1936. The seed bed was too dry, and there were stumps in the land cropped.

In 1933 I used the spring-tyne, until 4 inches of rain fell at the end of May. I had a big land half done. When the ground had dried out, I went two more rounds with the spring-tyne, then hooked on to the rigid. The land averaged 31 bushels. There was no appreciable difference between the early and late sown, but the two rounds sown with the spring-tyne yielded only 5-6 bags.

The rigid-tyne is seen at its best when seeding stubble land. It will do a remarkably good job in one operation, even late in the season, but two workings are often better. The roots, bits of straw, &c., do not stick to the points, and it bites through the stiff places better than a plough. It will not tolerate rubbish, but rubbish seldom troubles me. (It is remarkable how much that trembling action of the spring-tyne does help to sift the rubbish through the tynes). But the shares never become blunt or rounded on the points as with a spring-tyne; though they wear down to next-to-nothing they keep a point. The heels or wings of the shares are always down almost on a level with the points, and do their share of soil and weed-cutting constantly.

If one examines the work of the spring-tyne on rain packed fallow, one will often find that the points of the shares have scored a V-shaped gutter in the ground, the loose soil from this gutter being thrown over the weeds that the share-heels, up too high, failed to cut. It is in this condition of soil that the rigid-tyne does its best work; when weeds are strong, 5 inch shares can be fitted. There is no necessity to clean the mud away from the face of the shares as in a spring-tyne.

Every time the sowing boot on the spring-tyne bucks back, the falling seed is thrown back and does not fall on the seedbed but in the middle of the mulch, which is very undesirable when dry weather follows seeding. This bucking never occurs with a rigid tyne, and every grain is sown on the seed bed.

I prefer using the spring-tyne when conditions favour it, but when those conditions exist the land is often unsuitable for sowing wheat. Unless the seed bed is fairly wet, the rigid-tyne hooks it up in places. The machine I use is not particularly heavy to pull, but the original, with the the long floats, was much heavier. It is easier to push a share through the soil in the way it was meant to go than to drag it through face broadside-on, as the spring-tyne often does.

STUMPS—THE CHIEF DRAWBACK.

Although I concentrated on de-stumping operations on specified areas only, I was not able to get 100 per cent. clearance on those areas. When the rigid-tyne strikes the unsuspected root or stump, something has to go. Sometimes part of the stump breaks off; sometimes the share breaks, but it is easily replaced; sometimes the rounded bar on the floats bends and has to be straightened in the forge, an operation wasting a lot of time. There is now on the market a stump-jump rigid-tyne combine, which, if it can justify the claims made on its behalf, should find ready acceptance in this district.

Soils.

THEIR COMPOSITION AND MANURIAL REQUIREMENTS.

[W. GILES (Monarto South).]

It is a matter of common knowledge that no two soils are exactly alike. Soils vary in character according to the rocks from which they were formed, the extent to which weathering has taken place, the amount of washing and backing to which they have been subjected and to the suitability of the climate for promoting a vigorous plant growth. In lands under cultivation, the character of the soil depends upon the treatment it has received from the farmer. The variability of the soils is one of the main reasons why we should understand them, because in farming, more than in manufacturing industries, it is impossible to conduct the management by rule of thumb.

In its natural state a soil contains—(1) mineral matter, (2) organic matter, (3) water, (4) gases, and (5) bacteria. The mineral matter is derived from rocks and forms by far the largest constituent in ordinary soils. The organic matter represents the remains chiefly of decaying vegetable matter, and is referred to as humus. The water is received from the air as rain or by drainage from higher levels. The gases enter by diffusion from the air above or are partly manufactured in the soil. All healthy soils contain bacteria or plant germs. The composition of any soil may be determined by soil analysis. The amount of water is found by drying the soil. After drying, the amount of organic matter may be found roughly by burning it When this has been done, the ash or mineral matter only remains behind.

This mineral matter contains a great variety of substances, some of which are required for the nourishment of crops, but the crops can make use of them only in solution.

The main object of soil analyses is to furnish information as to the probable supply of available plant food and to supplement the soil with those found to be insufficient. Crops demand from the soil 7 essential constituents, nitrogen, phosphoric acid, potash, lime, magnesia, iron oxide and sulphuric acid. Varying amounts of each of these are present in all soils but the supply of essential constituents always appears insignificant when stated as a percentage of the whole soil. On the average an acre of soil to a depth of 9in. weighs about 1,340 tons. If this soil contains .075 per cent. of any constituent, this will be equal to about 1 ton per acre, so that even a small percentage of plant food means a considerable absolute amount. An ordinary chemical analysis can only show that the materials are present but it does not indicate the rate at which these will become available for the use of crops. On this account, an analysis cannot be used as a guide to manurial requirements, but it can indicate probabilities. If any one of these seven essential constituents of a soil is deficient, the crop will be deficient in consequence. Whether or not any of these foods will be deficient depends not upon the total amount which the soil contains, but upon the amount which it contains in a form sufficiently soluble for the crop to take it up. Generally it is found that only three of these seven constituents are ordinarily deficient in soluble forms, and therefore the other four require no further consideration by the farmer. The three constituents likely to be deficient are phosphoric acid, potash, and nitrogen. Manures are employed to supply soil deficiencies in soluble phosphoric acid, potash, or nitrogen. Some manures supply only one of these, some supply two while some supply all the three. The manurial requirements of a soil are determined by its deficiencies. The action of manures is direct because they supply what is deficient and in a form which is easily absorbed.

Judging by agreed standards of sufficiency for phosporic acid in the soils (under 50 parts per 100,000 poor, 50-100 parts medium and 100 or over normal to good) our Australian soils compare badly with them. Over 90 per cent. of Western Australian soils fell below normal limit of 100 parts, while 71 per cent. failed to reach the 50 limit. Equally bad results were obtained from Victorian soils. From this we can see our soils are definitely deficient in phosphoric acid, and were it not for the enforced use of super Australia could not be regarded as wheat producing country. To make wheat-growing a profitable undertaking it is necessary to apply phosphatic manures every time a crop is sown.

Potash.—We have very little need to worry about potash in Australia, because our soils contain a fair share of it. In sandy soils there is less than in heavy soils, and if fruit and root crops do not thrive an application of potash may be found effective. If our lands are well supplied with humus through ploughed in grass and crop residues, nitrification of this humus takes place and supplies the necessary nitrogen.

Rankness of growth and a deep green colour in the crop indicate a sufficient supply of available nitrogen; poor growth and colour indicate the reverse.

The Need for a Workshop on the Farm and its Uses.

[W. M. HEATH (Pygery).]

An essential on every farm is a workshop, including blacksmith kit, a few carpenter tools, sewing material for harness, etc. If one has a blacksmith kit there is not much that cannot be straightened. During the last two years I have gathered together part of a blacksmith plant, and have been able at times to get the service of a good 'smith, which has brought home to me the wonderful use of a smithy, the saving of time, also the saving of hard cash. Too many implements are scrapped on mallee farms, and we are too anxious to buy new implements, the cost of which keeps many men in misery. Why not take a few days between seasons and renovate the plough, stripper, binder, &c? Even if one cannot weld, there is a tremendous lot one can do. Looking back to pioneer days, I realise how useful a smithy would have been when one was scrub-rolling.

A few carpenter tools will be found a wonderful asset. Do not forget that at the present time in most schools woodwork is taught; therefore encourage your sons in these hobbies while at school, because to be handy with a few tools is a great help in every home. Most farmers can retimber a dray or wagon, that is, bodywork, shafts, etc. Sewing needles and beeswax or cobbler's wax are also essential. One realises their value when repairing reins, as riveting joints or cross reins, &c., often causes jarring of horses' mouths. Also one can often put a stitch in a binder canvas, couplings, &c.

When buying bar iron get 3cwt. or 4cwt. at a time. It is cheap, and this quantity saves freight, and a cwt. if one has a few jobs, does not go very far. Hoop iron has a lot of usefulness; one may make ideal one-horse swings from same. As the farm becomes older there are more jobs to be done. One looks forward to putting better gates and other conveniences on the place, and these often require a little iron work.

Blacksmithing on the Farm.

[P. LUESTNER (Nunjikompita).]

Blacksmithing is a trade that is closely allied to farming, because most implements are of iron; therefore when breakages occur or parts get bent a forge becomes a necessity, or loss of time is caused and serious inconvenience. Forge, anvil, vice and hammers would equip a smithy on a small scale, but it should not stop at that, as a blacksmith's shop cannot have too many tools. A good scrap-iron heap is an asset. When welding iron it is necessary to have a good fire of coke or coal, which must be free from clinkers. The two pieces of iron should be jumped up a little at each end, as the heat melts portion of it, and when hammered it would be smaller if not jumped up beforehand. The points should then be scarfed to a fine point. Welding heat is a sparkling white heat near to burning heat. After a little practice this can be done by the ordinary farmer. Various types of steel require dipping into sand just previous to welding, as this will give a more even heat.

Chisels are a necessity on any farm, and soon have the edges broken; therefore sharpening and tempering should be done by the farmer. Steel when heated and dipped in cold water will become hard; if heat is applied again, it will gradually soften. Therefore chisels could be done in the following manner—given a red heat and dipped in water for about 3 seconds, the point of the chisel will be coloured yellow, but in a few seconds a blue will appear. When the blue reaches the point dip the chisel into cold water; this will give a fairly useful cutting edge.

Poultry as a Sideline on the Farm.

[S. W. HEINRICH (South Kilkerran).]

Most farmers keep a few fowls in order to avoid having to buy eggs for household needs and, perhaps, a bird or two to eat occasionally.

Even with wheat at 5s. one can make it pay by feeding it to the fowls, because if wheat is up, cost of living is up; hence price of eggs is up and also value of fowls is better.

A man starting with fowls can keep about 20 or 30. They may be allowed to roost in the trees or in the stable or cowshed, although it does not cost much to erect a shed to accommodate them. Naturally a hen or two will go broody, and if set, should hatch a few chickens. Perhaps one may have more eggs than are required for household purposes, and these may go to pay grocery accounts. The stock will gradually increase as well as the supply of surplus eggs. By the time one has about 60 fowls, a larger fowlhouse will be needed. It requires about 20 bags of wheat or barley per year to feed 60 fowls, besides the pickings they find for themselves, and odd scraps from the house.

It does not pay to go to too great an expense in building fowlhouses, that is, building a shed to accommodate 300 fowls and only keeping 20. It is best to build a small shed costing about £10. A man should be able to make good interest on such a small outlay, even with wheat or barley included. The shed should be about 15ft. long, 12ft. deep and, say, 7ft. high at the front and 6ft. at the back, with about 4ft. 6in. of netting in front. Several roosts about 18in. apart will accommodate 80 to 100 fowls quite comfortably, and the shed should not cost more than £10 or £12. My experience for the first two years with about 40 fowls was that they consumed about 30 bags of wheat, valued at £11, and in the course of 2 months they showed an income of £29—a profit of £18. That does not allow for eggs consumed in the home or fowls dressed for table purposes.

In 1933 eggs rose from 5d. a dozen to 1s. 2½d . and averaged about 7¼d. per dozen. In 1934 eggs only reached 1s. 1½d. per dozen, and averaged 7¾d. per dozen. It can be seen from these figures that fowls are of some value on a farm. From the end of April, 1933, to the end of July, 1937, 3 dozen fowls increased to approximately 170, including roosters, and including 6 months supply of wheat at market rates, the fowls cost £74 to feed, and from eggs sold alone, £134 had been collected, leaving a profit of £60. I have now invested money to that value in a new fowlhouse, which has a 40ft. frontage, 10ft. of that being a room for storing grain for feed. The building is 15ft. deep, 8ft. high at the back, and 7ft. high in front. At the back is a concrete wall 1ft. high with iron above that to the roof. In front is a wall of concrete. 3ft. high with 3ft. 6in. of wire-netting above that up to the fascia board. The floor is concrete and the perches are placed on angle iron set in the floor about 16in. apart and 16in. above the floor. The shed is designed to prevent draughts and to prevent young fowls from injuring themselves by flying off high perches. The shed has a lean-to roof; with a gable roof some fowls always try to perch on rafters and may do themselves harm. There is a rainwater tank to catch water from the roof. Fowls must have water, and as much as they want of it. For convenience. one can fit automatic basins so that the fowls never go short of water. To make fowls pay. one has to select a good laying strain or keep a good dual-purpose bird—one that lays well and dresses well.

White Leghorns are best for laying, but are not so valuable as table birds. The next choice is the Black Orpington, which answers both purposes. but the hens are apt to go broody too often.

Every year one should ring the fowls, using a different colour each year. When a fowl is three years old, cull her out unless you know she is still laying eggs at that age.

In breeding, whether you are setting hens, using an incubator or buying day-old chicks, see that they arrive in the months of July or August, in preference to any other month of the year.

Animal Husbandry.

[R. J. James (Riverton).]

Wheat and hay growing, with a few sheep and fat lambs, were the chief sources of income until the depression. When the price of wheat became so low, farmers paid more attention to livestock to increase the returns from the land. The increase of livestock has greatly improved the income and would tend to increase the fertility of the soil. This being a good rainfall district, the land has been cropped very heavily in the past. When livestock are brought on to the farm, the first consideration is what are they to be fed on. Sheep are of great assistance to the farmer for cleaning up fallow, but this should not be overdone, and one has to consider how one is going to feed the flock. In the past we have relied on the natural grass, but there is room for a great deal of improvement by sowing feed such as barley, oats, peas, etc., more extensively.

There are various ways of dealing with sheep; straight out dealing; buying stores to fatten; wool growing; and raising fat lambs. Straight out dealing is a method that needs a good judge of values to be a success, and some are very successful. But it must be remembered that there are a very limited number in a district who may carry on in this way, or the competition would be too keen to allow much profit. Buying stores to fatten needs careful buying and is uncertain, the demand for stores being great when feed is good, and sometimes the same sheep fat, are worth very little more, so that wool-growing and fat lamb raising are the most reliable.

Wool-growing is a rather difficult job for the average farmer. The first thing is to purchase a good line of ewes, secure a ram suitable to mate with these ewes, and in this way build up a line of good, wool-producing sheep; and good returns can be obtained. It has its drawbacks; many farmers have not had experience in breeding wool sheep.

Fat Lamb Raising.—For this purpose a good line of large-framed, clean-faced Merino ewes should be purchased and mated to a pure English-bred ram. A more valuable lamb can be produced from a crossbred ewe mated to an English ram, but the time is not yet ripe for the crossbred ewe. Farms are not fenced well enough to hold them when they are used to feed off fallow after the lambs have been sold. The Merino ewe will breed a good lamb and is easily fenced.

The ram to be used is a matter of opinion. but the choice is between the Dorset Horn and the Suffolk. The Shropshire is a good sheep, but has too much wool on the head, with the result that there is trouble with the lambs becoming wool-blind. The Southdown is a good sheep for crossbred ewes, but, as stated before, our fences are not good enough for crossbred ewes, and the lambs are a bit slow from the Merino ewe. In stating that the Dorset Horn or Suffolk rams are best suited, it should be mentioned that the flock must be fed so as to allow the lambs to be marketed and not held over until after shearing, because they are not wool-producing sheep. They are mutton sheep, and when one sets out for fat lambs, one will find them good, quick-maturing lambs. Border Leicesters produce a lamb which, if held over, will pay for shearing, but when running on farm land it is hard to obtain the bloom.

The time for mating is about November, according to the time one wishes the lambs dropped. Some have considerable trouble with the rams leaving the ewes. This is very often caused by joining them when the ewes are on a fallow with very little feed. Another cause is recently dipped ewes. It is wise to yard at night until the rams start to work. Do not leave the crutching too close to lambing; this is often the cause of a good deal of trouble at lambing time. It is not a good practice to yard sheep and hurry them through the race; this also causes trouble and loss.

Lambing over, the main thing is to give them plenty of feed. If feed is short, change the sheep about as much as possible and they will respond, in preference to leaving them on the one paddock too long. The sooner the lambs are marketed the better, as fallowing reduces the area over which they graze. Dispose of most of the lambs if possible before shearing, as the shorn ewes take a lot of bloom from the lambs. Shearing is the next thing, and dipping should be done about a couple of weeks after shearing. Then the ewes are fit to be mated at any time one wishes.

PIGS AND CATTLE.

Pigs are quiet profitable to keep in conjunction with cows. One must decide whether to go in for bacon pigs or porkers. For baconers one must breed a pig suitable to the trade, one with not too much back fat, as over-fat pigs to-day do not sell well. For this purpose the Large White is best, but a very good bacon pig is produced from the Berkshire sow mated to the Tamworth or Large White. This cross is the best for porkers. There are two methods of caring for pigs—confined in sties, or in small paddocks. The system to adopt is a paddock for the sow when not rearing a litter; yards with a good shelter for farrowing; and small paddocks for pigs when weaned and until they go to market. The best time to wean pigs is at about 8 weeks. This is the time when a pig should be fed well, and if cows are kept, the skim-milk is a great help in keeping them going without a check. It is not long before they are porkers, which is the most profitable time to sell. After pigs are weaned, they should be provided with a self-feeder containing crushed barley, with water laid on to the yard.

In Justification of the Agricultural Bureau System.

[S. MORGAN (Maltee).]

Many times have we heard the doubt expressed if a farmer benefits from taking an interest in the scientific side of production. How often has the remark been passed that there is no need for the intrusion of scientific thought into the essentially practical business of farming.

The idea prevalent in the minds of some farmers—a minority, it is hoped—is that science or theory, as these men term it, is in opposition to practice, and seeks to displace the practical operations they have become accustomed to with some newfangled scientific operation.

That this is not the case should be obvious. The application of science to farming is an endeavour to discover the natural processes involved in practical manipulations, and so modify them, where possible, to enable greater efficiency to be achieved.

The co-operation of scientific thought with practice in providing greater efficiency is an issue of paramount importance.

The individual farmer, however, is much more interested in the factors of efficiency in so far as they apply to greater yielding capacity, the desire of most farmers being to produce the maximum yield, from the least expenditure of labour and capital. It is with this end in view that the peoples of most producing countries have caused to be erected their research institutes and experimental stations, with their equipage of modern apparatus and scientifically trained men, realising full well that only by the bearing of science upon the problems of production can solutions be expected.

Agriculture has too long been regarded as solely an art into which science should not intrude, but under the present economic and financial pressure it is becoming increasingly evident that greater heed must be paid to the principles underlying production, which are given to us by these workers for our benefit. We must discard our prejudices and enter fully into the realisation that though agriculture is still an art and always will be, no advancement can be expected without scientific reasoning; nor will advancement be realised unless we are prepared to co-operate to our utmost, with our scientific workers, and utilise the principles they lay down for us in the practical operations on the farm.

In providing the necessary contact for co-operation between the research worker and the farmer the Agricultural Bureau system is to be specially commended. Its ramifications extend to almost every district in the State, bringing the science of modern farming within the grasp of all farmers desirous of advancement. The officers attached to the Bureau are ever ready to discuss your problems with you and render whatever assistance they can. Whatever difficulties you may encounter and however perplexing, the Bureau provides you with the means of placing them before a specialist in the subject, whether they be connected with the land, the stock, the garden, or the home.

For a farmer to remain in the same groove all his years, with the remarkable facilities for the increase of his knowledge of modern agriculture now available to him is inexcusable.

Quite apart from the knowledge made accessible to the ambitious member, the Bureau has many abstract fulfilments, not the least of which is the engenderment of a sense of unity between the members of the farming community. The discussion and exchange of views on subjects of mutual interests cannot fail to produce a feeling of unity, a feeling which stops, not with your own desires for advancement, but tends to broaden your interest in the welfare of the district as a whole.

To realise the benefits obtainable from membership of the Bureau, it is not enough that you attend regularly. You must be prepared also to attend the meetings, not with the feeling of content to sit and listen but with the desire to be *active*, and, where possible, intelligently critical.

Many men are afraid of criticism, and are therefore, content to say nothing, but surely even they can see that it is only by the word of criticism that our faults in reasoning can be exposed to us. An earnest seeker after knowledge and enlightenment has nothing to fear from the critic, but rather has much to thank him for. Most of us are proud to be members of this organisation, and it must be our earnest desire to bring before all farmers who are not members the power of advancement to be derived in knowledge and social relationships through becoming active members.

Gardening on Upper Eyre's Peninsula.

[T. J. BATTAMS (Murraminga).]

Perhaps there is not another place in this State where the home or kitchen garden can be put to better use than in these districts on account of the distance from the Adelaide market.

Fruit and vegetables are often stale by the time they arrive here and often 5d. or 6d. a lb. is paid for fruit, and 9d. to 1s. for cabbages and cauliflowers of poor quality. On account of quicker transport the position is very much improved in the last three or four years. But there is still room for improvement, and the best way to get that improvement is to have one's own garden plot.

Vegetables can be grown here which will compare favourably with anything grown in any other part of the State if planted at the right time and given proper attention. Two things are against us in trying to garden here—the late Spring frost is the worst—and hot north winds. Although both occur at times in the more favoured gardening districts, they are not as often or as severe as here.

Market gardeners have a lot of pests to deal with which are unknown on the coast.

We have planted winter vegetables every year for the past 26 years. If the winter has been wet the garden has turned out well, but in the dry years the garden was almost a complete failure until the Tod water was laid on.

Make the garden where it is sheltered from the north wind as much as possible by a building or scrub. If the shelter is scrub, do not have the garden too close; mallee is a great robber and one often finds the roots two chains from the trees. The same applies to gum and pepper trees; do not plant them too close to where it is intended to have a garden. Use a fair dressing of stable manure every year. Manure well-rotted down is better than that carted out of the stable. Be sure to put a good fence around the garden to keep out all stock, rabbits, and poultry.

Four vegetables can be grown all the year round here, namely:—Silver beet, red beet, carrots, and parsnips. Plant the first seed early in the year. These will most likely go to seed in the Spring. Then plant another lot of seed in July or August; they should be too young to run to seed in the Spring, and if given plenty of water will keep growing all the following summer and and into the winter.

Potatoes and onions will also grow here. Onions do quite well, but potatoes are very subject to frostbite and could not be grown here in the winter; and they would take a lot of water if grown in the summer.

Peas should not be planted *before* May or June; if planted too early they may be frost-bitten when in the podding stage.

Most Summer vegetables do very well, such as:—Cucumber, pie melons, water melons, sweet melons, marrows, trombone, and pumpkins. Planting these plants fairly close together so as to keep the foliage as thick as possible makes a better shade for the young fruit.

The Tomato.

Every effort should be made to secure an early and prolonged supply. I have been growing tomatoes for the past five or six years. I was picking tomatoes before Christmas and have had a constant supply. They will keep on cropping as they have in the past, until the first bad frost. The two varieties of tomatoes to grow are:—Early dwarfs for early tomatoes and Burwood Prize for the main crop.

French beans do fairly well but require a lot of water. This past summer I planted a small plot and for several weeks was able to pick about a dipper-full three or four times a week. By planting them every three or four weeks there is no reason why one could not have a constant supply all the summer providing one had enough water. The variety was Canadian Wonder.

Rhubarb does well, and requires very little attention and will pay for any time spent on it.

A few mistakes that are often made by local gardeners in sowing seed, is that they often sow much too thickly. If this is done the plants should be thinned out until they have room to grow evenly. If over half the seedlings are taken out it is better than to let them grow up over-crowded, when they will never make good plants. In planting out young plants in the garden quite a lot of people plant them much too close together. If given a bit more room to grow one would have less plants but a lot more vegetables.

Power Farming v. Horses.

[C. F. Altmann (Monarto South).]

The following calculations are my experience over a period of 10 years. My tractor replaces 13 horses. It takes about 40lb. of good chaff to feed a farm horse one day; therefore, 13 horses consume 4¾cwt. per day, or 32cwt. per week. With chaff at £3 per ton the cost is £4 17s. 6d. Tractor costs for fuel, oil and grease is £5 2s. 6d., showing 5s. per week in favour of horses. With horses two men have to be on the job all the time. The wages of one man are in favour of the tractor. One may calculate for oneself the saving over horses when they are not working or when waiting for rain and there is no picking in the paddocks for horses.

Speed.—The present cry of high speed in tractors is not an advantage, because the implements are not built for it. When fallowing the result is too wide a furrow and the soil is not turned properly. On drills and combines there is undue wear. With harvesting machinery it simply cannot be done, if one wants the grain in the bag and not on the ground.

Another thing to be considered is the number of sheep one can keep where 13 horses are kept. At a low estimate I would say 60. If all ewes, they should produce 50 lambs and 2 bales of wool.

With tractors the great cry is repairs. Who worries about the repair bill when working horses—repairs on harness and tackle, knocked about fences, repairs to stables, yards, cleaning up stables, &c.? Who has ever calculated the cost? If the average life of a farm horse is 10 working years, one horse must at least be replaced every year.

In buying a tractor be sure to have ample reserve power and never load to full capacity. Do not be misled by demonstrations. The machine will do all sorts of things when new, but it will not stand up to it and the repair bill will be as heavy again as if you give the machine a comfortable load at all times.

Levers.

[A. H. KELLER (Yandiah).]

The word *lever* stands for "something which exerts influence," and it behoves anyone in charge of or operating machinery to see that this influence is exerted to the best advantage.

It took hundreds of years to invent the lever, yet we so often find that the operator of a machine or implement does not use it to the best advantage. A modern machine attains its efficiency through the operation and proper control of the levers on it.

We all know the functioning of a lever, but to know just when to make use of it is a different matter. With the combine it is necessary to make good use of the levers to ensure the planting of the seed at an even depth. We often find little depressions or hard and crusted patches in the soil when seeding, which means that a little more pressure must be applied to the tynes by the medium of the lever; or if a stone reef or partly hidden stump is encountered, the lever should again be made use of to raise the tynes sufficiently to move over the object without fear of breaking tynes. It is cheaper to replace a worn-out lever than to be constantly replacing broken tynes. The same applies to the plough as to the combine, excepting that this implement is built for heavier work and becomes strained out of shape if allowed to be drawn over reefs or stumps with the same application of pressure. One such case came under notice where a team driver was sitting on the seat and applying the whip to his horses when they steadied up on the plough striking a hidden reef. When there were no seats on ploughs and the levers were built at the back of the implements, more attention was paid to their control.

The Binder is a machine which is made up of parts working at high speed, the failure of any of which may cause serious trouble; but just as important as any of these parts are the unimportant looking levers, which when correctly used help the driver considerably. For instance, if the crop being cut is uneven in height, it is essential that the fans be lowered with the shortening of the crop, otherwise the knife cannot make a clean cut.

Even on the Header the lever plays an important part, and the driver should not be too lazy to use it. When in a crop with a heavy growth of straw, it is advisable to control the levers so that the comb barely catches the heads. If a machine has to handle a double quantity of straw, it means that such parts as the thresher have to work under a much greater strain, which naturally also increases the draught.

Last, but not of least importance, is the gear lever of a chaffcutter. This should receive regular attention, keeping it well oiled and making sure that it works freely; in case of an accident or some stick or wire getting into the machine it may be called on to do its job in an instant.

My Experience With Poultry.

[C. F. Neumann (Upper Wakefield).]

Only too frequently the remark is heard, "What's the use of keeping poultry for the production of eggs, as it is definitely not a paying proposition with the present high price of wheat and costs of production in general." I intend to outline a scheme by which any farmer, with any knowledge of the subject at all, can make an appreciable profit. Firstly, it is essential to have firsthand and authoritative information. For the modest sum of 2s. 3d. one can purchase a copy of Laurie's "Poultry Manual," which contains all the necessary information. It is necessary to select the breed of bird most suitable for the climatic conditions. The White Leghorn lays the largest number of 2oz. eggs over a given time. Their chief drawback is that a sudden change of weather or feed gives them an enormous setback in production. The fowl most suitable where such conditions prevail, is the laying strain of the Black Orpington, although they lay a large percentage of under-weight eggs.

Housing.—All that is necessary is to construct a house that is absolutely free from draughts. It must be remembered that a fowl roosting on a tree is not at any time in a draught. Draught causes untold sickness.

Feeding.—A sudden change of feed is most detrimental to egg production. The birds must be fed according to seasonal conditions. In summer months soaked wheat is quite satisfactory mixed with a small quantity of meat meal and as much green feed as the birds will eat. During the colder months make a practice of adding (up to one half of total feed), crushed barley, which is soaked with the wheat. Of course, in the coldest months the amount of meatmeal is doubled about 1oz to every 6 birds. Greenfeed all the year round is essential, as it provides the minerals which are so necessary for egg production. The main crop is lucerne, although during the winter months early-sown barley is relied upon. Is is a wise policy to occasionally supply the fowls with a quantity of oats and to see that plenty of shellgrit is available at all times. Shellgrit is used by the bird to form a shell which is even and hard and therefore less liable to breakage in transport. During the winter months poultry should have plenty of material where in they may scratch, and so keep themselves warm and healthy.

Always see that plenty of clean water is available, and to this occasionally (say once a week) add a quantity of Epsom Salts. Water should always be placed in wooden utensils, so that various minerals which would rust iron may be added. Under present circumstances it is less expensive to buy pullets, as chickens require a lot of time and trouble, and then, as a rule, over 50 per cent. are roosters. Roosters of this breed do not pay to fatten for market; the price paid is usually low, because of their inclination to be small in size. In the case of chickens, separate the males from the females as soon as the sexes are distinguishable, and from these males select your stock for breeding purposes. Here also care should be taken to select a strong, vigorous, healthy bird, showing true male characteristics. Selecting the female for this purpose requires careful watching; it is advisable to breed only from the stock which lay 2oz. eggs or over and which lay in the winter months, when egg prices are at their maximum. For this purpose it is wise to construct a special breeding pen, where the desired birds may be mated. For a good percentage of fertile eggs I recommend one male to every 8 or 10 females. If more females are mated per male the stock will be weak and subject to disease. In order to make poultry a payable proposition, a suitable market must be found for the produce, but if only first class and guaranteed eggs are marketed very little trouble should arise here. The chief facts to be remembered are to collect eggs twice a day regularly, to provide good clean nests, and in the summertime to use as cool a storage as possible. Use great care in handling at all times, so that the air cells in the product remain intact. It is never advisable to keep the same fowls for more than three years; after that time they definitely do not pay for their feed. If faithful old layers are put in a separate pen and fed on wheat and given a very limited amount of exercise, they will fatten in a few weeks, and should then return, at least, half of their purchase price. Cleanliness in every part of the industry is most important. Pens should be cleaned out at least once a week where a run is provided, and once a day where fowls are practically on the same place all the time. Records should be kept of the number of eggs laid each day, and at the end of the week there will be no need to spend unnecessary time counting eggs. These can in turn be kept right through from week to week, and eventually from year to year. Then in a separate book keep records of all eggs sold and price received, and also all expenses in connection with the hobby.

The Forge on the Farm.

[F. Gardner (Koppio).]

A farm is not complete without a forge. In addition, the shop should be equipped with an anvil, vice, drilling machine, a set of taps and dies, and several pairs of tongs, a hand and striking hammer. It is surprising what can be done with these tools even by amateurs in the art of blacksmithing, and a lot of time can be saved where one is a distance from a blacksmith.

On wet days one can put in quite a lot of useful time in a blacksmith shop repairing swings, chains, and any other breakages which occur from time to time, and after a little practice it is surprising what even an amateur can do with the forge. Horses in this district require to be shod most of their working time, and this work is impossible without the aid of the forge for fitting, clipping and punching shoes.

Other uses for the forge include sharpening crowbars, which soon wear down in hard ground, also ploughshares, which do better work in semi-hard ground when drawn out on the edge a little.

A very good idea for a beginner is to try and make a few split links. These require no welding and are not usually made from very heavy iron. In fact when practising I made a lot of split links from old No. 4 wire, and since I could weld a link I have used yards of it for mending plough chains.

Very often a bolt is required for a special purpose and has to be made. If a shop is equipped with a set of taps and dies it is not a difficult matter to make almost any bolt. Extra tools can be added to a shop as time and money permit. Money spent on good tools is money spent wisely, while quite a lot of tools can be made in the shop with a very little trouble. The drilling machine is also very necessary, with a range of bits. With this lots of breakages in cast iron which cannot be welded on the farm can be plated and riveted. The best fire for the forge is obtained by using a mixture of fine coke and charcoal; of course ordinary coal can be used, and even charcoal can make quite a good fire.

Cellulose.

A New Industry for our State.

[W. Heinrich (Black Springs).]

The cellulose industry promises to become one of South Australia's greatest assets, employing as it will a considerable amount of raw material known as straw. This is a further step to put an end to a wastage which otherwise could be directed into a profitable industry which would necessitate the building of factories and consume a considerable amount of power and water. Cellulose is the chief constituent of the cell-walls of plants and is therefore widely distributed in Nature. In such forms as wood pulp it is extensively employed in industries, in the manufacture of paper, in the production of linen, cellophane, celluloid, explosives, building boards, and linoleum. An experiment was carried out to convert the indigestible cellulose from sawdust into cattle feed by cooking in dilute sulphuric acid and then eliminating the acid. The result was a brown meal not tasty enough to tempt the cattle to a great extent. Wood, which takes years to grow, and from which cellulose is procured will probably take second place to straw, the straw being available in large quantities in our own State.

The South Australian straw meets with approval, and the establishment of an industry such as the manufacture of cellulose will benefit another industry—farming. It holds possibilities, and when developed will prove a benefit to the community and lessen the burden of unemployment.

Soil Erosion.

[O. Kermode (Black Springs).]

"Soil Erosion" is only one phase of a complicated natural process which is continually at work around us. It may be dealt with under several headings:—(*a*) The agents of erosion; (*b*) transportation of eroded material; (*c*) deposition of sediment. The agents of erosion are many and varied. The chief of them are:—(1) Heat and cold; (2) the action of the air; (3) running water; (4) wind; (5) chemicals in water; (6) wave action and glaciers. (1) Everyone is aware of the effect off quenching hot glass in water. The alternate heating and cooling of rocks has similar results, reducing larger stones to smaller fragments. (2) The active element of the air is oxygen and this acts directly on rocks, and its effects can be easily observed especially among softer rocks. (3) Running water is nature's chief sculptor, and the continual action of streams is practically the sole cause of the formation of valleys. (4) In drier areas wind is the most active force. (5) Most water contains carbon dioxide in solution. Such water is weakly acidic and dissolves limestone fairly readily, resulting in the formation of caves in limestone areas, such as those in the South-East and the Nullabor Plain. (6) Those who live near the sea are well aware of the tremendous erosive action of waves which are continually at work, reducing our coasts slowly, but none the less surely.

It is the action of running water and wind (the transporting agents of erosion) which result in what we commonly call soil erosion. These two forces remove loose soil and deposit it in layers, either in the sea, in lakes or some other basin. Such erosion is only harmful where it exceeds in rate the formation of soil by the agents mentioned above. The Adelaide Plains are a result of this action of running water which we see can have beneficial as well as harmful results. By upsetting the balance of natural resources man assists the agents of erosion to remove the comparatively thin layer of soil which covers the solid rock, and upon which our whole existence depends. The overstocking of pasture land, the wilful and unnecessary destruction of our forests, the cultivation of soil unfit for agricultural purposes, as well as the presence of that bane of the pastoralists—the rabbit—all tend to assist in the denudation of the soil.

The chief agent of erosion in our district is running water, and the numberless creeks which cross our fields, and which are continually enlarging their banks, bear testimony to its force. These can be dealt with effectively by constructing artificial drains or by planting suitable plants along their banks. The former method is expensive, but the latter is both cheap and efficient. It is amazing to witness the apathy of farmers to what will, no doubt, constitute a menace to their holdings.

It is the duty of every farmer and pastoralist to do his share in reducing the evil effects of erosion by the reduction of stock where necessary, the preservation of existing timbers, the planting of suitable trees and shrubs, and the destruction of rabbits. The example set by other nations can be followed. America has learnt to her cost the evil that attends the ruthless destruction of forests, and following the disastrous dust storms of the past year, her proposal to plant a belt of forest fifty miles in width over a distance of 1,000 miles is eloquent proof of her appreciation of the efficacy of the forest in combating the evils of erosion.

Care of Farm Horses.

[I. Paech (Summerfield).]

To maintain the strength of his team the farmer naturally has either to buy additional horses or breed from his own mares, the latter being by far the most satisfactory. A mare during in-foal period may be worked at almost any farm work up to within a fortnight of foaling with benefit to the mare, as it will keep her from becoming over fat. The mare should be so placed that she can do her work without jerking and avoid being squeezed by other horses in the team. Never use short swings which will allow the chains to rub the abdomen of the mare. A week before foaling it is advisable to separate the mares and if possible put them in a small paddock near the house, so that they can be kept under constant observation. If the mare is required to work during the time she is suckling a foal, this can be done after the foal is eight weeks old, but the mare should not be separated from the foal for more than 3 or 4 hours. If the foal is allowed to follow the team, it will probably prove a hindrance and is liable to receive injury. Never allow a foal to suck when the mare is heated, as this may cause the death of the foal. The foal should be weaned at from 4 to 6 months and should be shut up in a yard with free access to water and be fed at regular intervals on good nourishing food. Always bear in mind that feeding is half the breeding. At 2½ to 3 years a colt is fit for breaking in.

When breaking in young horses always be kind and gentle, yet firm, never losing patience. When hitching up the team see that the chains are both of the same length, and swings and spreaders of the right width. When horses have been turned out for some time they should be worked for short hours for the first few days. Watch the horses for the first day or so, in case they have sand, which might prove fatal. Give them short spells fairly often to allow them to cool down a little. They will not only keep fresher but will work much better. Do not expect 8 horses to do the work of 10. Always start early in the morning and knock off early at night; this latter will give the horses a chance to dry and they will not be so liable to catch cold. Watering the horses before feeding will not hurt them at all, even though they are hot, when once they are used to it. The walk in from the paddock will in most cases have cooled them down sufficiently. Never forget to groom down thoroughly both body and shoulders; this is as necessary as a well-fitting collar to prevent sore shoulders. Keep all collars clean by scraping off any sweat and dust that may have accumulated. Putting a bag under the collar helps to prevent sore shoulders to a certain extent.

The stable should be cleaned every day and straw put in, as some of the horses may want to lie down. It is a bad policy to clean the stable once a week; not only is it uncomfortable for the horses, but it takes much longer to clean.

Feeding is the most important item of horse management, and the farmer must use his own discretion to a great extent. A manger should never be filled and then left until empty before being refilled. A horse should receive just as much fodder as he will reasonably clean up. Under natural conditions the horse is a bulky feeder, and under working conditions bulk is essential to his feed. Even where concentrated feeding is resorted to the admixture of chaff prevents over-hasty feeding and promotes digestion. Oats whole or crushed rank as one of the best grains for horses. Each horse should have his stall, so that he is able to get an equal share of feed. During the time the grass is drying off young horses should be watched in case they contract stoppage during damp weather.

An old saying has it, "the horse is the farmers' best friend." The farmer who is a lover of horses will not send old horses to market. The noble old servants have probably done more than their share of work and should be shot. This is certainly the most humane ending.

Fallowing.

[J. Bottroff (Summerfield).]

Prior to fallowing it is always advisable to have the land in good order for ploughing. The feed in the paddocks should be kept as short as possible, and where an abundance of dry grass or stubble is present, a good burn is advisable.

The fallowing should be done with a plough; the type of plough does not make much difference, so long as all the soil is completely turned over and no strips are left between the furrows. If strips are left the weeds grow exceptionally well on these, and if not fed off they will run to seed. Keep the plough down to a depth of from 2½ to 4 inches.

The depth, of course, depends on the type and depth of the soil and the time of the year the fallowing is done. It is possible to plough 1in. deeper in June or July than in September or October, because the later fallow will not consolidate. Sandy soils or soils where clay is very shallow should never be ploughed deep; on the other hand some of the deeper loamy soils may be ploughed to any depth within reason, provided the sour clay subsoil is not brought up.

Fallowing should start soon after seeding is completed and should finish, if possible, by the middle of August. It may be cross harrowed if weather permits, and is then ready for the cultivator, as soon as weather and soil become suitable for the operation —which generally occurs with the first drying winds in early or mid-September. If weeds have made growth, sheep should trim them down. The first cultivation should be done deeply, and every working after that should be done to a shallower depth, and should be completed before weeds have seeded.

Put the sheep on the fallow occasionally, and give the second cultivation about mid-October. If done in the right weather this will leave the fallow in good order. It should be left in that condition over the summer months. If the fallow must be worked on account of weeds, it should be done at a shallow depth, and when the soil is moist—never work fallow in a dry condition. Should rain fall soon after harvest, keep the scarifier harrows busy on the stiffer soils, and use the cultivator on the lighter soils to prevent drift. Never work the fallow deeply after the first cultivation; it will only spoil a good seed bed.

Lower North Pruning Competitions.

[Langdon Parsons Trophy.]

The following are the results of the first year of the fourth series for the Langdon Parsons Cup open to all competitors in the Lower North Pruning Competitions and to be won outright in three years by the competitor who scores the highest aggregate points in all sections of the local competitions:—

Competitor.	Address.	Points (600).
J. B. Helbig	Greenock	569
F. M. Elliott	Williamstown	557
R. Schulz	Koonunga	555½
F. H. Schulz	Koonunga	555
A. Andriske	Lone Pine	554
C. F. Wilksch	Greenock	552½
A. Smith	Watervale	552½
V. Duke	Penwortham	552½
A. T. Leske	Williamstown	552
E. Burgess	Watervale	549½
F. Nayda	Penwortham	549½
C. A. Hoffmann	Lone Pine	549
A. Burgess	Watervale	547
O. Burford	Watervale	544½
E. B. Kruger	Light's Pass	543
B. Fromm	Lone Pine	542
D. J. Bain	Williamstown	541
E. Schulz	Koonunga	539
E. P. Filsell	Williamstown	537
H. Kappler	Lone Pine	533
S. Turnbull	Lone Pine	533
M. Duke	Penwortham	531
E. G. Helbig	Greenock	531
E. A. Wilksch	Greenock	529
O. Kurtz	Light's Pass	527
A. Wayman	Watervale	526½
M. Morrison	Penwortham	526
H. Linton	Light's Pass	526
W. Koop	Light's Pass	522
A. Milde	Lone Pine	519
W. Ahrens	Light's Pass	518½
R. E. Elliott	Greenock	518
W. R. Parmenter	Williamstown	513
W. C. Ledgard	Williamstown	512
R. Ward	Greenock	509
C. Robertson	Greenock	509
K. Robertson	Greenock	506
B. T. Habermann	Greenock	504
E. Glaetzer	Watervale	503
K. A. Bishop	Williamstown	500

C. M. Roennfeldt,
Permanent Secretary.

Activities of Women's Branches

The Editor will be glad to receive good photographs with which to illustrate papers written by Bureau members.

Bottling Fruit and Vegetables.

[Miss RUTH WHITFIELD (Milang).]

As the fruit season approaches, the housewife naturally begins to think of the various ways and means whereby she may preserve part of the harvest for use in that period of the year when but little fresh fruit is available. Several ways of doing this are in comparatively common use; the most common of all being jam-making. Then, certain fruits may be dried and stored away, and some kinds are particularly nice when crystallised. The most convenient and satisfactory method of preserving fruit is bottling. In jam-making the amount of boiling required destroys some of the properties contained in the fresh fruit, and so diminishes the food value. Dried fruits require soaking for the table, and so are not so convenient for some time before they can be prepared as one could wish. But a woman with a well-stocked preserve cupboard has an advantage, in that she can serve an appetising and dainty meal at very short notice. Even unexpected visitors cannot put her off her balance, and every women who has had to struggle to prepare a meal for people who "just popped in" will realise what a boon it is to be able to produce something nice without any fuss and bother.

BOTTLING.

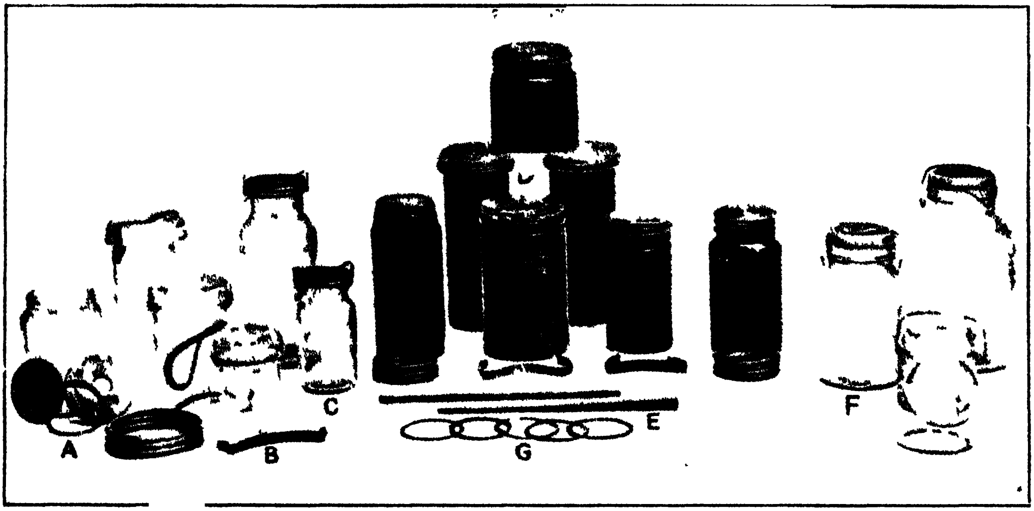
There are a number of methods of bottling fruit, all more or less successful. Some people cook the fruit, bottle, and seal it down at once. Others pack it in jars to cook without the lids, and screw these on when it is done. Both methods have their drawbacks, and their consequent failures, and in neither case does the fruit keep its fresh colour or its firm, rounded shape as a rule.

THE FOWLER METHOD.

It is among the most modern and successful methods yet known, is simple to work, and the margin of failure is practically nil. It is necessary to have a set of jars, a thermometer, and some kind of steriliser which provides accommodation for the thermometer. Fowler's steriliser is the best and most convenient, although it is possible to manage with a makeshift one. It has a hinged and perforated platform on which the jars stand, so that the water circulates all round them, and there is no danger of cracking them, even if the temperature has to reach "galloping" point. Some people raise the point that the entire outfit is too expensive. In defence of this, it can be said that the first cost is almost the last, as it costs very little to renew the rubber rings, which are all that is necessary, once one has the number of jars and other accessories.

The fruit needs to be sound and ripe, but never over-ripe. Any fruit which is too ripe rises in the jars, and in some cases, as for instance, pears, it clouds the syrup. As soon as one may remove the stone easily from peaches and apricots, they are ready to bottle. Pears must be turning yellow, but not soft; plums and other small fruit, ripe, but not squashy.

It is a matter of choice whether the fruits are peeled or not. Some people peel peaches with a knife, a laborious and very sticky process. It is possible to procure a small machine for removing the peel while the peaches are in a caustic soda bath, but for a small number, this can be satisfactorily done by dropping the peaches into a solution of about 1 teaspoon of caustic soda to 1gall. of boiling water. Leave them in the water until the skins come away readily, then drain off the caustic solution and cover them with cold water, peeling and packing them from there. Peaches can be halved or quartered to suit the type of jar, apricots halved and overlapped, placing the cut side down. Pears can be done with or without peeling and coring, accordingly to choice. Cherries and the berry fruits are shaken down by gently tapping the jar occasionally while packing. A packing stick is handy when filling a jar which is too smal to allow the hand to enter it. It is easily made, being merely a round stick, sharpened to a wedge at once end. This end is useful in placing the portions of fruit, and they can be pushed gently into place with the blunt end. Pack the fruit tightly, yet without squashing it in. to within ½ inch of the mouth of the jar.



It is advisable to fit the rubber ring before the jar is filled with syrup, and so avoid spilling syrup if the jar is tilted. Have the rings in a cup of water, and they are easy to handle and do not cling to the fingers. Fit them carefully into the groove near the mouth of the jar, being sure they are not twisted, as this may result in a faulty seal.

The syrup should be made sometime beforehand and allowed to cool until lukewarm. Putting hot syrup on the fruit causes it to discolour quickly when it is turned out of the jar. The fruit may be bottled either in water or syrup, but the latter method is most commonly adopted. Syrups may be made light or heavy, according to taste. A rule of thumb measure popularly adopted is to use 1 cup of sugar to 1 of water. Fill the jars brimful with syrup, adding a little at a time to allow it to fill the cavities in the fruit and expel air bubbles. Let the jars stand a short time, then fill again if necessary, fit the cover evenly and fasten down with the spring clip.

The Steriliser.

The jars are now ready for the steriliser, which must contain sufficient water so that they are submerged to about 2ins. from the top. The water may be warm, but not very hot when the bottles are placed in. The contents are then brought up slowly to the specified temperature and maintained there for the required time—*e.g.*, apricots are maintained at 160deg. for 2½ hours. Obviously, a kerosene stove or some other cooker in which the heat can be regulated is most suitable for the purpose, and requires very little fuel. Such a cooker is a great saving of trouble, for once the fruit has reached the given temperature, it may safely be left while other work is attended to, until it is time for the jars to be removed from the steriliser. A wood stove, though it is more difficult to keep the heat even, can be used quite successfully.

When removing the jars from the steriliser be careful not to displace any of the spring clips, as this would spoil the seal of the jar. Place the jars in a convenient place to cool, and leave for 36 hours until perfectly cold. Then remove the clips and test the jars for leaks by placing a pencil or some other article with a straight edge across the top of the jars. If there is a dip in the cover, the jar is properly sealed.

Preserving, however, does not end with the fruit season. Vegetables, meats, and fish can all be successfully bottled, and indeed, when one begins, the possibilities of an outfit are endless. Pickles, soups, and even plum puddings can all have a place in the preserve cupboard.

MEATS AND VEGETABLES.

These require a second sterilisation, for the bacteria present are more active in them than in fruit, thus necessitating extra precaution. French beans and mushrooms are prime favourites among the vegetables. Be careful to get young, fresh beans, as the slow process of sterilisation tends to exaggerate stringyness. String and slice them as for immediate use and pack them, tapping the jar gently on the table to make them pack closely together. Next blanch them by filling up the bottles with boiling water, putting on the cover and leaving for 15 minutes. Do not be afraid of cracking the jars, for so long as the water is not poured direct into the glass, the beans will lower the temperature sufficiently to avoid mishap. Drain off the hot water, fill up with a solution of ½oz. salt to 1 pint water and sterilise.

Mushrooms are cooked as for immediate consumption. The bottles are packed with hot mushrooms and placed in a steriliser containing fairly hot water. Mushrooms when they are removed from the jar can be used in any way one desires.

Poultry, also, is cooked as for the table. Joint the bird, cooking the thick parts in a casserole and making broth of the thin parts. When it is sufficiently cooked, bone it and pack the flesh into bottles, filling up with broth to every pint of which has been added ½oz. of gelatine.

Bottling most fruits is almost unbelievably cheap in a district like ours, where fruit is always reasonably priced in season. Most fruits average about 3d. per jar to bottle, and for a 2lb. jar, this is indeed a low cost. That amount includes cost of fruit, sugar, fuel, and the rubber ring for the jar. In some few cases where fruit is dearer (*e.g.*, cherries) the cost consequently rises, but in cases where one has one's own fruit (or other material) the cost is still lower.

Finally, one comes to look on bottling rather as a pleasurable hobby than a housewifely duty, and there is still plenty of scope for experiment in this fascinating art. Then there is the satisfaction of knowing that a few hours' work to-day means a supply of appetising food for months to come, and what a pleasure that is. Again, these jars solve many a problem when any sickness strikes the home. Invalids can have abundance of the dainties, expense might otherwise force us to deny them, and so the tale goes on. For picnic parties, there is another problem solved. Indeed there is no end to the uses and the possibilities of these magic jars, once a start has been made with the fascinating work of bottling.

Gardening.

[MRS. E. A. WHITFIELD (Milang).]

The majority of people are interested in gardening. It may be trees or shrubs, vegetables, flowers, or pot plants; all make interesting studies and are pleasant to look upon if well kept. Some gardens are used as a means of livelihood, others as a hobby, but whichever it may be, it needs the same degree of care to make a success. There are so many things to learn about gardening, and although one may have had long experience, there always is still more to be learnt.

February and March are the best months for sowing seed of most of the winter and spring-flowering annuals, perennials and early vegetables. It is best to raise the seedlings; then a suitable day can be chosen to put them out and there is not likely to be so many failures. Should there be failures, there will be fresh plants to fill in the spaces.

The soil for the seed pans or pots should be prepared. A little well-rotted cow manure and sand mixed with the soil is good, and the day before sowing give it a good soaking. Cover with a piece of newspaper until the seed commences to germinate, but be careful not to leave the paper on too long, or the plants will become delicate and burn easily with the heat of the sun. Keep the top of the ground watered by using a very fine spray and the plants will grow fast while the weather is warm, and will soon be ready for transplanting. Dig the beds roughly 2 or 3 weeks before needed. Let them remain for a few days, then scatter a little slaked lime air to sweeten. It is good to move the soil over them and leave them for the sun and and turn it again once or twice before commencing to plant the seedlings; but do not manure it heavily; this is often the cause of young plants dying.

Handle the plants carefully in order not to injure them, and as soon as they are in give them water (even if it is raining during planting operations) to set the soil about the roots. There may still be some hot days, and the young plants need protection from the sun. They may be mulched to guard against heat and drying winds. Lawn clippings are excellent for this purpose, or old grass—preferably without seeds—is useful. Move the top of the soil very lightly from time to time; avoid hoeing. The roots of some plants form close to the surface, and hoeing cuts these and the plant has to form new ones. A light dusting of lime occasionally checks insect pests and helps to sweeten the soil. When the plants have grown and show signs of flowering, it is a good thing with some varieties, to nip out the centre. One may have to wait a little longer for the first flower, but the plant will be more compact and shapely, and the wind will not be so likely to break it. The Carnation answers to this treatment admirably; as soon as the centre can be cut out, do so, with a penknife, and it will grow into a shapely plant. Any plant which has a tendency to grow tall and be caught by storms, will be far better if treated in this manner.

When the plants show signs of flowering and have formed buds, they may have a little liquid manure once a fortnight.

"Floraphos" is one of the best artificial manures for this purpose. It is safe and easy to use, as well as being inexpenive. If flowers are needed for cutting, the Carnation is one of the most serviceable. The plants are easy of cultivation and hardy. April is a good month for planting, and they require renewing every 2 years. If left longer, they become woody and lose their blooming qualities. The Chabaud variety blooms almost continuously, and if left disbudded, produces excellent flowers. As soon as the buds are large enough to handle, nip off all but the centre one; also any small growths which appear on the flower stem down to about the fourth or fifth notch from the main stem. When cutting flowers, about the same number of notches will be sufficient to make fresh growth and keep plants from becoming spindley.

ROCKERIES AND BULBS.

At present, rockeries are popular. Before making a rockery, a suitable situation should be chosen. A wall, hedge, or shrubs form a good background. As most plants which are grown on a rockery like a sunny position, have it facing an easterly direction, if possible. There are many different plants which grow well on a rockery and make quite a brilliant display when in bloom. The most hardy are the Cacti or Succulents. They do not require so much attention and watering as do others.

Bulbs which have been planted in March or April will be showing above the ground soon after the first good rains, and should be kept lightly cultivated. A mere scratching of the surface is all that is required to prevent it from caking. It is a mistake to give the bulb any strong forcing manure. Some varieties should not be given manure of any sort. When raising plants for the glass or shadehouse, sow seeds early and while the weather is still warm. Plants raised from seed sown late, rarely make fine specimens, as they come into flower before the plants develop to the same extent as those that are sown earlier. When seedlings are large enough to handle, prick them off into boxes, allowing about 2ins. between the plants, so that they can be taken up easily for potting later on; or they may be planted in small pots. Water by allowing the pot to stand in a vessel of water until moisture shows on the surface of the soil, and put it back on the glass-house shelf so that all surplus moisture will drain off quickly. During hot weather the glass-house must be kept as cool as possible, and the atmosphere must be kept moist. To gain this, the floors of the house should be well watered morning and evening.

SHRUBS.

Before planting shrubs, be sure and obtain varieties that are most suited to soil and situation. A shrub that will thrive in the cool hills districts, as a rule, will not thrive in a warm, dry situation; neither will shrubs suited to a dry situation do well in the hills. There are many beautiful varieties to choose from. Amongst them are our native shrubs, of which the Lantana is one of the most beautiful. When planted during mild weather, it gives the best results. Even in poor limestone soil it thrives, flowers for a long period and requires very little attention. Lantana should be pruned during September just before it commences to make new growth. The Geraldton Wax Plant is another favourite among native shrubs. Spring flowering shrubs can be pruned directly they have finished flowering, and summer flowering deciduous shrubs can be pruned as soon as they have dropped their foliage.

No matter how beautiful a home may be, there seems to be something lacking if there is no garden around it; and after all, it is easy to keep a garden and so have flowers to brighten the home.

Needlework.

[MISS D. HASSAM, Milang.]

Stitches are the scales and exercises of embroidery, and a good working knowledge of these is the first essential foundation of the art. This does not mean that every amateur must set to work to learn all the stitches, any more than a writer would have to learn a dictionary by heart before starting to write a book.

The number of stitches it is possible to execute may seem alarming at first, but when it is realised that the art of embroidering with the needle was already of high merit in olden days and since then has formed part of the cultural development of every nation in the world, it is not surprising that it has been possible to collect 305 stitches, every one different, every one giving some new and delightful effect.

'With such a heritage it is often disappointing to find—among all the beautiful embroidery produced to-day—so very little originality in the choice of stitches, the same well-worn favourites, Daisy-Stitch, Fly-Stitch, Chain-Stitch, Satin-

Stitch, appearing again and again with monotonous regularity. Embroidery, like every other art needs to be understood to be enjoyed. Once the rules of the game are known, there not only comes the urge to create needle and thread, but a knowledge which enables the better appreciation of the old masterpieces, as well as those of our day. We are enjoying a revival of all arts and crafts—it is fashionable to be dexterous—and since it is better to be out of the world than out of fashion, it is well to know something of the art which will soon be the past-time of every woman. Besides, there is always infinitely more joy and satisfaction derived from the simplest tray-mat evolved by one's own brain and fingers than from 20 ready-made articles of more elaborate conception.

Embroidery has been woman's art through innumerable ages. Each archeological expedition throws the beginning back still earlier; the excavations at Ur reveal how high the standard must have been centuries before the Hanging Gardens of Babylon became a seventh wonder of the world.

Since those days women of all countries and all centuries have quietly added their quota, and in the days of the Renaissance such heights of beauty and technique were reached that the value of the work was often beyond its own weight in gold. Throughout the Elizabethan, the Jacobean, and the Georgian eras, this glory continued practically undiminished; and it was only at the beginning of the 19th century, with the advent of the machine age, that it began to wane, and, later, almost vanish, stifled beneath the avalanche of "art needlework" and Berlin woolwork so beloved of the Victorians.

Now comes this great Renaissance of the 20th Century! Full of life and virility and promise, and it is up to this age to see its struggling efforts mature. From "scales and exercises" in embroidery one progresses to the "counterpoint" of embroidery, as the stiches are grouped and arranged in sequential melodies or works, each containing the principle upon which still grander and greater works can be founded. These various types of embroidery are not the invention of this age, nor of any one age in particular, but the collective efforts of countless ages, and mainly developed from a peasant design.

The mention of "peasant" immediately brings to mind a mental picture of men, women, boys, and girls in quaint, weird, or pictureque costumes, dancing or making merry. How much more do we know of the people than this mind picture whose embroidery designs we are adopting. In these days of wireless, travel, and authoritative books we are only half enjoying needlework if we do not broaden our minds and absorb from interested study some of the good knowledge that may become ours for the seeking.

There may appear less time to-day than of yore in which to produce works of an elaborate nature; but there is always time to produce good small pieces. Besides, count the assets of modern civilisation. Material already woven, threads of fast dyes, inexpensive and perfect needles, transfers with designs ready prepared shops with demonstrators, clubs, and organisations for mutual help, museums free of charge, where the best works of any age may be seen, and libraries where books can be read free of charge. Half the work is already done.

There are those who decry the use of printed transfers, but it is one of the necessary pillars in the rebuilding of this great art, so long neglected and untaught. Again, many are too nervous to attempt original design, and would for ever miss the joy of the work, were it not for transfers and stencilled canvas. This prejudice is a hindrance rather than an aid to progress, for manufacturers are not encouraged to improve the standard of the designs. We need better transfer designs drawn by experts who understand embroidery. At the moment designs are made by artists who perhaps understand drawing as applied to line and water colours, but not the requirements of the needle. The day will come to each student when she will

POUNCING, TRACING, AND TRANSFERRING.

There are many ways to offset a design on material for embroidery. The older and more usual is by "pouncing," but it is too complicated and out of date. Ready-made designs are offset by means of printed transfers.

Transparent materials, such as fine silks or lawns, can be pinned direct over the drawing and the design traced directly on to the material with water-colour paint and a fine brush, or even a pencil.

Carbon paper as used for typewriting is sometimes used to offset designs on fine materials. The carbon is placed face downwards on the material with the drawing over it and the design pencilled over in firm lines. A good pointed knitting needle gives a finer and evener line than a pencil. This method is not recommended, for the carbon is apt to smudge and mark the working threads and fabric. It is better to rest the hand on a ruler, slanted off the drawing when making the outline.

A few successful transfer inks are now on the market and greatly simplify the business of transferring designs, as the outline of the design can be painted over on tracing paper, placed above the drawing and, when dry, be ironed on to the material like a printed transfer. This method gives the design in the reverse, and in cases where this is not desirable, the tracing must be turned over to face the table, and another tracing made over this; it is not advisable to retrace over the back, as the front side would be covered with sticky ink and difficult to iron.

A substitute for transfer ink is made in the following way:—Dissolve 1 teaspoon of Reckitt's washing blue with 3 or 4 teaspoons of sugar in a very little water, and pound well together until the grain of the sugar quite disappears. Use as described and when dry, the design is offset with a warm iron.

For those who are unable to draw or adopt their own designs, a printed transfer is necessary, and providing a careful choice is made with an eye to a good design, some very good results are obtained. Sometimes a friend possesses an attractive piece of traced work and one desires the design for a piece of material. Pin the traced piece to the wood bordering the glass of a window that faces the bright sunlight; place the material on paper on which the design is to be copied—the light through the window will show you the lines quite plainly, and then can quickly be drawn over with a lead pencil. Printed transfers are sold in blue, yellow, and black print. Yellow is only satisfactory on black material; blue is the best colour for all light shades. Black is better for blue, green, or brown materials.

REMOVING TRANSFER MARKS.

The simplest way to remove the marks of printed transfers on linens, &c., is to wash with pure soap flakes and hot water. For an unwashable material, the marks must be carefully and gently rubbed with a clean rag, dipped in benzine, and placed before a closed window in the sun. Art Gum (glove cleaner rubber) will take off carbon marks and faint smudges. A teaspoon of Cloudy Ammonia in a cup of hot water and a piece of clean rag to sponge with, will remove almost any soil. Another method is to immerse the whole article in a bleach solution of borax water and soak for some hours.

Crochet and Tatting in Art Silk thread can be cleaned by dipping in pure benzine, or covered with powdered starch and placed away for several days in an air-tight box.

WASHING AND IRONING.

Most modern embroidery threads will stand laundering, and some boiling, and provided the material is also of a washable nature, the work can be laundered without any qualms. Dissolve pure soap or good soap flakes in hot water and afterwards wash cold until little more than luke-warm. Immerse the embroidery and move gently about, but do not rub. Next rinse in warm, then cold water. Dry quickly. Iron on the *wrong* side, placing the work face downwards on to an extra thick blanket or two Turkish towels folded, so that the embroidery is not flattened out with the iron. A damp cloth spead over the work will prevent any possibility of singeing. To wash delicate fabrics and embroideries, soak over night in strong salt and water (provided the colours are fast). This will remove a great deal of surface dirt, after which carefully immerse in warm soap and water, and move about gently but never rub. Lux and Persil are excellent mediums. Roll up in a towel and iron as described.

STYLES OF WORK.

Applique or Applied Work is the method of applying one material to another by means of decorative stitchery. There are two forms, "on lay" and "in lay," and the work was probably invented by the Persians or Indians as an inexpensive imitation of the richer embroideries. Applied Work has a long and ancient history occuring and recurring in wares of great popularity through the centuries. It was lavishly used by the Egyptians and Greeks, appeared again during the Crusades as a decoration on knights' surcoats, horse trappings, tents, &c., and later still was revived by Botticelli, who used it for church banners. After this last revival, it reached a height of classic importance. The designs took a delicate and lacy character akin to fret work, embroidered upon rich luxurious fabrics suitable only for ecclesiastical or heraldic embroideries.

Of late it has enjoyed yet another wave of popularity, but one in which all classic tradition has given way to modern experiment, as beyond all other forms of needlework, Applique affords the widest scope for individual expression; admitting no limit to subject or material. Modern designs are moulded and built on a heroic scale, in much the same way as a sculptor uses lumps of clay. Any kind of material —plain and printed cotton, silks, braid, buttons, felt, leather, or American cloth is used, and in cases where embroidery is literally designed by the mile, as for theatre curtains. Applique Work produces a maximum effect with the minimum labour of the needle.

Black Work is the name given to any embroidery worked in black thread on white material, and is said to have been introduced into England during the reign of Henry VIII. by Queen Catherine of Aragon and her ladies. For this reason it is often called Spanish Work, though actually it is of great antiquity, being adopted by the Spaniards from the Moors and Arabs, who in turn borrowed it from the Egyptians and the Persians.

Some of the most exquisite drawn fabric and lace stitches are used in this work with fillings such as distinguish the Jacobean embroideries. Like Jacobean and Mount Mellick embroidery, it is a work of pure stitchery, but just as refined in quality as these are bold.

BRODERIE ANGLAISE.

This beautiful open form of embroidery is also known as Ayrshire, English, Eyelet, Madeira, or Swiss work, and consists of open worked spaces, varying in shape and size, which are cut or punched with a stiletto and then overcast. The edges of the work are finished with scollops. The classical period of Eyelet Work, to use the old name, belongs to the late 18th and early 19th centuries, when it appeared on dress sleeves, caps, underclothes, babies' clothes, and house linen in elaborate patterns.

CANVAS EMBROIDERY.

Canvas work is embroidered on a canvas background. The stitches cover the entire surface of the material, and the finished work presents a woven appearance almost akin to tapestry, which probably explains why the name "tapestry" is so erroneously applied to this form of embroidery. As early as the Middle Ages it was in use, and at frequent intervals, through the Tudor and Stuart epochs, but it was the late 17th and early 18th Century that it reached the height of its glory. During the 19th Century it deteriorated sadly into Berlin

Woolwork of Victorian days, displaying poor designs and gaudy colourings. From this state it was rescued by the William Morris movement, and to-day takes its place with pride among the most popular forms of embroidery.

TAPESTRY.

Tapestry is woven on a loom and cannot be classified under the heading of embroidery at all. Tapestry weaving is one of the most ancient arts, in which the Greeks, Egyptians, and Copts were all highly proficient many hundreds of years ago. Weaving differs from ordinary weaving, as the warp threads are completely covered by the weft threads, and the designs and colourings are solid and distinct, as in painting and embroidery. During the Middle Ages and the Renaissance, tapestry weaving in Italy and France reached the height of its glory, and the "arras" which adorned the walls of castles and chateaux took its name from the great tapestry industry in the French town of that name.

Cut Work is the name given to those forms of embroidery where portions of the foundation are "cut" away from the background of the design; and the title embraces:—(1) Simple-Cut Work; (2) Renaissance; (3) Richelieu, and (4) Italian cut work. The work has a distinct air of grandeur and rich lace-like effects can be obtained by increasing the number of "cut" spaces, until its appearance almost resembles Venetian or Reticella lace. In Simple Cut Work the spaces are quite small, but in Renaissance Work they grow larger and are decorated with bars; while in Richelieu Work the addition of picots to the bars makes the work still more elaborate. But the most ornamental of all is Italian Cut Work, which is built up around small open spaces, filled with needle-point stitches. Cut Work is suitable for decorating all lines and some of the finer fabrics.

Darning—Every stitch has its day, even Darning Stitch; and in the 18th Century it was the fashion to make a sample of darning stitches. A form of darning popular in Denmark is worked on huckaback towelling. This material, which is woven with tiny loose loops at regular intervals all over the surface, invites the addition of darning stitches, which are threaded under the loops to form borders on towels, &c.

Drawn Thread Work is of a delicate lace-like nature, necessitating the removal of certain weft or warp threads of the material, and adding decorative stitchery to those left. This classification should embrace Needleweaving, Hardanger and the older forms of Hedebo embroidery; but since all bear such distinctive characteristics and are so widely known by their local names, a separate section for each needs to be given. Drawn Thread Work is used chiefly in the form of borders from which the threads have been withdrawn in one direction only.

Hedebo Embroidery is a Danish form of cut and drawn work, in white on white linen, and flourished chiefly in the 18th and 19th Centuries among the peasants who lived on the flat tract of land known as "Heder" (the heath), which lies between Copenhagen and the former capital Roskilde. "Bo" means to live, and the name "Hede(r)bo" is derived from this source, being the work of the people who lived on the heath. Originally Hedebo Embroidery was a simple peasant art used to decorate the men's shirts, women's underclothing, sheets, &c., and the workers wove their own linen and designed their own patterns.

HARDANGER EMBROIDERY.

The people of Hardanger, a mountainous district in Norway, at the head of the Hardanger Fiord, are famed all over the world for a beautiful open-work embroidery known as Hardanger Embroidery. This is characterised by little rectangular groups of satin stitches, known as "Kloster" blocks, arranged to outline the cut spaces and build up the major portion of the design. The design is so arranged that these blocks build up a pattern of squares and rectangles, following the warp and weft of the material.

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All communications to be addressed:
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A. P. BLESING, *Minister of Agriculture*

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Agricultural Bureau Conferences, 1937

Hills Districts, at Mount Pleasant (Conference and Field Day), Wednesday, 27th October (Mr. W. K. Johns).

Fruit Districts, at McLaren Flat, Tuesday, 2nd November (Mr. W. H. Kyloh).

Kybybolite Experiment Station, Visiting Day, Friday, 12th November.

Turretfield Field Day, Thursday, 18th November.

Each Conference will commence at 10.30 a.m. Members of Branches are invited to submit papers and questions for the agenda of the Conference in their respective districts.

Agricultural Shows

We have been advised by Secretaries of Agricultural Show Societies that their shows will be held on the following dates:—

Minlaton, Wednesday, 27th October.

Tatiara (Bordertown), Wednesday and Thursday, 27th and 28th October.

Millicent, Saturday, 30th October.

Burra, Saturday, 30th October.

Yankalilla, Saturday, 30th October.

Mount Barker, Saturday, 6th November.

Woodside, Saturday, 13th November.

Kalangadoo, Saturday, 13th November.

Mundalla, Wednesday, 9th March, 1938.

Mount Pleasant, Thursday, 17th March, 1938.

Overseas Wheat Quotations

By courtesy of the New South Wales Marketing Bureau, the South Australian Department of Agriculture is supplied regularly with statements showing overseas quotations for wheat to the nearest eighth of a penny. The accompanying table gives weekly quotations in London, the State or country of origin of the wheat, and months of shipment or delivery.

Date of Quotation.	London Values.								
	S. Aus. Wheat.	W. Aus. Wheat.	Manitoba No. 3 Wheat. ex Vancouver.	Argentine Wheat.	Karachi Choice White Wheat.	American Hard Winter Wheat.	White North Pacific Wheat.	Russian.	
	Sept.	Sept.	Oct.	Jan.-Feb.	Sept.-Oct.	Oct.	Oct.-Nov.	Sept.-Oct.	
1937.	*s. d.*	*s. d.*	*s. d.*	*s. d.*	*s. d.*	*s. d.*	*s. d.*	*s. d.*	
Sept. 23..	5 7½	5 7½	5 10⅞	5 5⅛	5 6¾	5 4¾	5 3	5 0¾	Victoria—3,000 tons (afloat) at 5s. 6d. South Australia—8,500 tons (afloat) at 5s. 5⅝d.; 500 tons (Sept.-Oct.) 5s. 7⅛d.
					Oct.				
Sept. 30..	5 9¾	5 9¾	6 3⅜	5 6¼	5 9⅜	5 7	5 3⅝	5 4½	South Australia—3,766 tons (Sept.) at 5s. 9¾d.; 1,400 tons (Oct.) at 5s. 9d.
	Oct.	Oct.	Oct.-Nov.		Oct.-Nov.	Oct.-Nov.		Oct.-Nov.	
Oct. 7..	5 9¾	5 9¾	5 11½	5 4¾	5 8¼	5 5¼	5 2½	5 5¼	South Australia—5,000 tons at 5s. 9⅜d.

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Progressive Centennial Development of the Pastoral and Agricultural Industries of South Australia, 1836—1936

[By Arthur J. Perkins, O.B.E., Life Member of the Advisory Board of Agriculture and of the Agricultural Bureau, Chairman of the Governing Council of the Roseworthy Agricultural College, sometime Director of Agriculture (1914-1936), Principal Roseworthy Agricultural College (1904-1914), &c.]

(*Continued from page* 128.)

THE FIRST DECADE, 1836-1846.

CHAPTER VIII.—continued.

Land Settlement Policy of Colonisation Commissioners—"Special Surveys"—Their importance to the South Australian Company — Rising values of Town Lands — First Selection of Preliminary Landholders—McLaren delays claim for Special Surveys—Criteria adopted in choice of sites for Special Surveys—Reservation of land by Fisher for Secondary Towns—How Port Adelaide became the property of the South Australian Company—MacLaren's vacillation—He sets out to secure the first Special Survey but fails.

Although, at heart, David McLaren undoubtedly welcomed the decision of his London Directors to claim several Special Surveys in the colony, nevertheless on receipt of instruction therefor, he seemed singularly remiss in the matter, almost reluctant to give effect thereto.(15) So halting an attitude in one usually prompt and decided in action can perhaps best be accounted for on the following score. McLaren was far from unmindful of the economic advantages that these Special Surveys appeared to offer—very far from it: indeed the more he brooded over the matter, the more convinced he became that in the skilful handling of them lay dormant incalculable opportunities to retrieve some of the unprofitable ventures into which the Company had been inveigled: he knew, too, that satisfactory realisation of such opportunities would depend almost entirely upon the degree of judiciousness and skill that could be brought to bear upon the selection of each Special Survey; and that however much he might seek to placate his employers by stressing in advance his own unfitness for such a task, nevertheless, whatever the outcome, the full blame for failure would inevitably be laid at his door: it would in fact—to compare small things with great ones,—be a repetition of the drama of the unsuccessful military commander in war time: no excuses accepted, however apparent their validity. Moreover at that time—early 1838—the colony had been but sparsely and imperfectly explored: there was some knowledge of the areas immediately adjoining the capital city; the great River Murray, seen as yet by a limited number only, had nevertheless been allowed to acquire legendary grandeur in the minds of the many; it was popularly visualised as taking its stately course through an alluvial valley of exceptional fertility, and eventually assuming the function of principal commercial highway of the island continent: the reedy shores of Lake Alexandrina, to an equal degree unknown, were already pictured in the imagination of the people as thronging with prosperous settlers; the pastures of Mount Barker, with perhaps greater justification, were acclaimed as finer in quality and value than those of any other district hitherto discovered in New Holland or in Van Diemen's Land; the magnificent harbour of Port Lincoln must in no distant future become the inlet and outlet for important commercial ventures, but whence or whither such ventures were to come or go, the sanguine settlers had not yet had time to determine: but nothing, or next to nothing, was known of the important plains and uplands to the north of Adelaide; of the south-eastern plains and hills, and of the vast tract of country now known to us as Eyre's Pensinsula.

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(15) David McLaren to Edmund J. Wheeler, 26th April, 1838.

Such then was the meagre and on the whole purely conjectural information that McLaren and his possible rivals—if such there were at that time in the colony—had to guide them in their search for Special Surveys of present or prospective value: and in the circumstances, we might well account it wisdom in him, that rather than risk a mistaken, and possibly costly selection of land, he should have elected to play a waiting hand, leaving it to the future, and to such additional information as it might disclose, to point the way to the most desirable line of action. Moreover, apart altogether from the obvious difficulties of choice McLaren had others to face as well—difficulties with which his special training should have rendered him more apt to cope—financial ones, in fact—but which nevertheless might yet prove insuperable, as they had had a habit of doing, both before and after McLaren's time. His London Directors had taken the precaution of letting him know that their sudden decision to make extensive purchases of country lands in South Australia, had been—partly at all events—based upon the erroneous—as it turned out to be—assumption that the Colonial Government would be prepared to accept payment therefor in notes of the Company's Bank (16). But the Resident Commissioner—J. H. Fisher—had informed McLaren that he—Fisher—had had no special instructions on the subject, and that in the circumstances he must stipulate for actual cash payments for land, or approved Bills on London, or possibly to some extent Land Orders taken up previously in the United Kingdom. On the other hand, McLaren had been given clearly to understand that for the time being at all events his London Directors would not welcome additional drafts on themselves; and for the payment of large purchases of land he was therefore thrown back upon the meagre liquid assets of the Company's Bank, a limited number of Preliminary Land Orders which had not yet been converted into Preliminary

(16) Edmund J. Wheeler to David McLaren, 7th June, 1837.

Purchases, together with such London credits as he might succeed in collecting. And in this manner, was staged a second conflict of loyalties between McLaren, the Bank Manager, on the one hand, and McLaren, the Commercial Manager of the Proprietors of the same Bank, on the other. (17) As Manager of the only Bank operating at the time in South Australia (18) he had good reason to know that apart from the transactions of the South Australian Company there had "been very little capital introduced into the Colony" and that "the extensive operations" that had been carried out there had been possible only "owing to the facilities afforded" to the Government and the public by the Company's Bank. (19) Further, the fact that in the early years of settlement by far the major proportion of provisions and necessaries of life had had to be secured in the eastern colonies and be paid for in cash—a fact that was aggravated by the delays in the country surveys—had led to a chronic shortage of specie in South Australia, such quantities as emigrants might from time to time bring over with them, rapidly disappearing over the border. So acute was the position, and apparently so little appreciated in England, that even McLaren on behalf of his local Bank, had repeatedly to clamour for more ample remittances in specie, which should bear "a greater proportion to the orders upon us than hitherto." (20)

Hence, in circumstances such as have been detailed above, should McLaren the Commercial Manager have decided to give immediate effect to his Board's wishes, and proceed to take up several Special Surveys in the Province, McLaren the Bank Manager would have found himself constrained to provide strictly in advance not less than £4,000 in specie, or corresponding approved credit for each Special Survey so taken up: but as matters then stood, this could only have been done by husbanding with miserly hands the already straitened liquid assets of the Bank, and thence by refusing financial assistance to the public, including rival applicants for Special Surveys; notwithstanding the fact that to have granted such assistance would have been legitimate banking business, and exceedingly profitable at that. It was a curious commentary on the above discussion that eventually the first Special Survey to be claimed in South Australia —nor as will be seen in the sequel was it to be claimed by the South Australian Company—should have been financed by the new branch of the Bank of Australasia, and not by the long-established Company's Bank (21): and this early intrusion of a second Bank into the Colony's affairs, whilst undoubtedly to the advantage of the latter, could be clearly traced to the injudicious combination of the offices of Manager of the pioneer Bank and Commercial Manager of its Proprietors, in one and the same person.

It remained to be said that apparent agricultural or pastoral value was not always the sole criterion adopted by claimants in their selection of land for Special Surveys: had it been so, we should have found it difficult to understand how it came about that £1 per acre should have been paid for the flagstones of Tailem Bend, knowing as we did that within the same twelvemonth not a penny more was paid for exceptionally fertile tracts of land in the Lyndoch and Mount Barker districts. On occasion, therefore, it would seem that considerations other than Flock and Herd returns or Crop yields must have swayed decisions in the matter: and although at this distance of time we should find it difficult to enter wholeheartedly into the assumed merits of such considerations, we were nevertheless bound, if at all possible, to make fair allowance for all of them. We

(17) See Chapter VI. for McLaren's strange behaviour in the matter of the attempted sale of E. J. Eyre's overland cattle.

(18) The Bank of Australasia did not open operations in South Australia until 14th January, 1839.

(19) David McLaren to Edmund J. Wheeler, 18th April, 1838.

(20) David McLaren to Edmund J. Wheeler, 18th April, 1838.

(21) *South Australian Gazette and Colonial Register,* 19th January, 1839, page 3, col. 3.

must, for instance, be prepared to recognise in the irresistible attraction of great sheets of water—and specifically of the River Murray and Lake Alexandrina—the natural bias of a people fresh from a land of many waters and unremitting humidity, but cast for the nonce in a new country in which this necessary of life seemed to be unpleasantly lacking. With such vast areas to choose from, on the other hand, prematurely early enthusiasm over Port Lincoln Harbour and its immediate surroundings was more difficult to follow, unless indeed we were allowed to attribute it to that enchantment which distance was said to lend. But the most potent of all attractions might well have been the prospective ownership of an important tract of land, costing but £1 per acre, but so situated that it might eventually be made to carry one or more cities, or townships, or even villages: to the prospective proprietor thereof it offered dreams of exceeding wealth: indeed to such an extent had belief in the progressive but irresistible rise in new urban land values captured the imagination of the day, that about that time—1838—a "*Secondary Towns' Association*" was formed in England, with the avowed object of seeking Special Surveys in South Australia, wherever it seemed probable that Secondary Towns might be established with advantage: and John Morphett was appointed local Colonial Representative of this Association.

It must be admitted that both the original South Australian Act and the Regulations of the Colonization Commissioners appointed to administer the land affairs of the new Province, had gone a long distance towards making smooth the way for land speculators of this type. The Act itself had made no specific reference to urban properties of any kind; but merely decreed that the Colonization Commissioners should throw open to purchase by British subjects *all the lands of the Province*, with the exception *only* of such portions thereof as might be required for roads and footpaths; that such land should be sold in public for ready money at a uniform upset price, whatever the quantity and whatever the situation of the land; and that such upset price should never be less than 12s. per acre in any case or at any period.(22) The Commissioners, on the other hand had thought to give effect to these mandatory provisions of the Act by prescribing in their Land Regulations that "Surveyed lands shall be divided, as nearly as may be, into sections of 80 acres each, with the exception of *the site of the first town* which shall be divided into one-acre sections"; that "one month's public notice shall be given of the time when any portion of public lands will first become open to purchase"; that "all applications" for such land "must be made by sealed tender" with the exception of one thousand acres "comprised within the site of the first town," which apart from the 437 sections disposed of previously to Preliminary Purchasers in England "will be put to auction"; and that subject to future increase, should such "be deemed expedient," the uniform price of public land shall be £1 per acre.(23)

It will be noted therefore that neither in the Act itself, nor in the Regulations deriving therefrom, was express reference made to the future Secondary Towns of the Province: but because of this it must not be assumed that the latter had at no time received consideration by the Commissioners, were it but in negative form: indeed the wording of Paragraph 13 of their original instructions to Colonel Light showed that the Secondary Towns had not been altogether overlooked, namely: "Wherever you find a good harbour you will cause the neighbouring land for a considerable distance to be carefully examined, and if the spot is well suited for the site of even a *secondary town* you will direct such a survey to be made as will enable the colonial commissioner, if he thinks proper, to include the district in the lands offered for selection to the holders of the

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(22) An Act to empower His Majesty to erect South Australia into a British Province or Provinces, and to provide for the Colonisation and Government thereof (15th August, 1834).

(23) See Appendix IV. at the end of volume.

first 437 land orders." And again in Paragraph 18 of the same instructions: " . . . . You will provide for such a division of the lands into townships and counties as may hereafter be determined by the Colonial Government." (24) And it was doubtless statements such as these that the first Resident Commissioner—J. H. Fisher—had in mind when confronted with the then unsolved problem of the Secondary Towns of the Province, he imagined that he was doing no more than meeting the wishes of the Commissioners, when he reserved, or temporarily withdrew from sale, sites thought to be suitable for Secondary Towns at "Nepean, Encounter, Holdfast, Yankalilla, and Rapid Bays": and duly advised them accordingly. But unfortunately the Commissioners thought otherwise with the result that the receipt of Fisher's dispatch created quite a flutter in the Adelphi dovecotes: and in this connection early steps were taken to apprise Fisher's successor—Colonel Gawler—of the Commissioners' views to the effect that "the making of such reserves" was "contrary to the provision of the South Australian Act which" declared that "all the lands of the Province shall be open for public sale." (25) It would appear however that the mere act of reserving such sites, or temporarily withdrawing them from public sale, could not rightly be construed into an implication that such sites would not be available for public sale at the appropriate moment: hence the Commissioners would have found themselves on more solid ground if they had pointed out that such "reserves" might imply that the land in question would be put up for sale in unit-areas of less than 80 acres, or disposed of by auction, and not by sealed tender: and that if that were so, in either case a breach of the Commissioners' Regulations would have been committed thereby. In any event, this dispatch of the Commissioners came as a bombshell amidst Governor Gawler's public spirited plans for the establishment and development of Glenelg and New Port Adelaide, respectively: under these plans the surrounding land would have been put up to auction, acre by acre, and the proceeds of the sales would have been used for local improvements, such as roads, bridges, &c.: (26) but it was not to be: and according to Gawler in compliance with the wishes of the Commissioners these plans were discarded and the Secondary Towns were handed over to the tender mercies of private enterprise, which when astutely directed waxed fat thereon. A single example should suffice to illustrate the regrettable position created by the prejudices of a hide-bound Board of Commissioners, who had they so desired, could have reserved land for Secondary Towns, as they had done for the Capital City.

As soon as it became apparent that Governor Gawler was in some trouble over his well thought out plans for the New Port—to which by the way David McLaren had always been more or less covertly opposed—the latter sought an interview with the Governor, and informed him that he—McLaren—"had learnt that some of the Preliminary Holders had resolved to choose their reserved lands at the New Port . . . . " and that as he, as representative of the South Australian Company "had the first choice of reserves in the district" he "could not forego" his "right unless he "had security that others would not exercise theirs. This" the Governor "could not give," and in the circumstances McLaren was pleased to think that the Company "would have the first 134 acres which will be a splendid affair." The Company had also fourth choice for another 134-acre section in the same neighbourhood. The allotment of these New Port sections took place on the 16th January, 1839,(27) when McLaren succeeded in

(24) First Annual Report of the Colonisation Commissioners for South Australia, page 33, Appendix 9.

(25) Robert Torrens, Samuel Mills, Josiah Roberts, and James Remington to Governor Gawler, 8th November, 1838.

(26) See Appendix VII. at end of volume.

(27) David McLaren to Edmund J. Wheeler, 5th January, 1839.

securing not only Section "A," "Key" Section of the New Port—in the opinion of both Governor Gawler ([28]) and McLaren the only practicable site for a commercial harbour for many years to come—but in addition Sections "D" and "K" as well. It was recognised however that this effectiveness of Section "A" as a site for a commercial harbour was conditional on a substantial roadway being thrown across the swamp: the costs of laying down such a roadway had been estimated at from £14,000 to £15,000. Governor Gawler, whose Treasury coffers were empty, reported to the Colonisation Commissioners, that immediately prior to the allocation of the New Port Sections, McLaren had gone out of his way to assure the Governor that "he had power to make a road to Section 'A' at the Company's expense; and without expressing the least expectation of assistance from the Government, he intimated his intention of doing so" should he be fortunate enough to secure Section "A" for the Company: but no sooner had the allocations been made, and the Company placed in possession of Section "A", than their Manager informed the Governor that in his—McLaren's—opinion "the whole expense" of the road should "fall upon the public purse!" ([29])

On securing this valuable property, McLaren lost no time in endeavouring to bring it into revenue-earning condition: early steps were taken to build a road across the swamps on the tacit understanding that should the Government refuse, or be unable to purchase the road at cost price from the Company, the latter body would have the right to levy tolls upon those who made use of it. The construction of what came ultimately to be known as the *"McLaren Wharf"* was also put in hand.

Although in his own mind, McLaren was firmly convinced that Section "A" was at the time the best practicable site for a commercial port, and would continue so for many years to come, yet he could not wholly divest his mind from the fear that rival wharves might subsequently spring up in the neighbourhood and seriously interfere with the Company's prospective profits: at Section "I," for instance, on the North Arm, recently acquired by Hewitt, but previously strongly championed by both Governor Gawler and Captain Sturt ([30]) as the most suitable site for a port: and then there was Section "B," immediately opposite Section "A," and owned by Abel Smith, whose local representative was Robert Gouger, the Colonial Secretary. The owner of Section "I" was holding out for £800, but eventually sold it to the Company for £240. "If His Excellency should again wish to transfer his partiality to Section 'I' I am prepared for him," ([31]) wrote McLaren to his London correspondents. Section "B" he succeeded in renting from Gouger at the relatively low rate of £3 per acre for a period of seven years, with a right of renewal for a second period of the same length.([32]) These low figures which assured to the Company immunity from rivalry of Section "B" should be compared with the rates per acre which McLaren confessed having in mind for Section "A," namely, £100 to £150 per acre.

The progressive growth of McLaren's ideas as to the value of Section "A" may be gauged by a few extracts from his London correspondence. *16th January,* 1839: McLaren purchased Section "A" with a Preliminary Land Order at the rate of 12s. per acre, *i.e.,* £80 8s. in the aggregate. *11th May,* 1839: "Section 'A'—the site of the New Port—will come to be one of the most valuable of all the valuable possessions of the Company. . . . . I think I could now sell that Section (134 acres) for £100 per acre average," *i.e.,* in the

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(28) Governor Gawler to Rowland Hill, 16th February, 1839.
(29) Governor Gawler to Rowland Hill, 16th February, 1839.
(30) Captain Sturt to Directors of the Railroad Co., 26th November, 1889.
(31) David McLaren to Edmund J. Wheeler, 30th August, 1839.
(32) David McLaren to Edmund J. Wheeler, 30th August, 1839.

aggregate £13,400. *23rd October,* 1839: To Bagshaw & Co., Calcutta—"I have been offered £1,000 for one acre, and hope to render this the most valuable part of the Company's valuable property." *14th November,* 1839: "I have had several applications for small portions of land at Section 'A'—in fact almost every merchant in town has made application." *10th January,* 1840: "I have begun to make sales privately of small portions of Section 'A.' Mr. Morphett had the first choice: he has taken one acre at the price of £1,500: . . . . in the course of ten days or a fortnight I expect to sell 13 or 14 acres averaging £1,500 per acre." By the end of January, 1840, *i.e.,* about twelve months after McLaren had purchased Section "A" for £80 8s., he was able to advise his London Board of the sale of 11½ acres for £16,310, or at the mean rate of £1,418 per acre. Under Governor Gawler's original scheme these enormous profits which were now flowing into the coffers of the Company would have gone to the making of roads, the building of bridges and other social amenities. How the matter affected Port Adelaide and was criticised some seven years later will be gathered from the following extract from a letter of an anonymous correspondent to the *South Australian Register*:—

"The increasing influence of the Export trade of South Australia justifies an inquiry as to what can and ought to be done to give the necessary facilities for discharging and loading ships of suitable tonnage for the demands of this Province. It is palpably evident, whatever private interests may urge to the contrary, that the present wharf or anchorage, is attended with much delay, expense and danger . . . . "

"But the South Australian Company—what will you do with them? Give an intrinsic value to their land at the North Channel, and leave them to reflect on the folly of their late Commercial Manager, who by trick or chicanery, not only rendered his own name notorious, but entailed injury upon his employer. It may not, but it ought to be known to everyone in this Colony, that the land along the banks of our Port was, after many consultations which took place between Governor Gawler, the Manager of the South Australian Company and others, surveyed for the specific purpose of enabling the colonists to secure wharfage and warehouse room and to attain that dignified position to which the index of our colony pointed. All applauded the arrangement proposed by the gallant Colonel—every thinking mind anticipated the morning star of improvement which was to shed its resplendent rays over the shipping and commerce of our future Empire."

"I have said that all applauded the plans proposed—that of laying out narrow strips of land along the Port—purchasing it in trust—giving original proprietors of land at the Old Port portions in lieu of their then valuable property—selling the remainder to the highest bidder, and laying out the money from such sale in roads and other public works. Plans were made, examined, altered and finally the land was surveyed and agreed to. Mark the result! The Manager of the South Australian Company presented an old order, claimed Section 'A,' and notwithstanding the remonstrance of the Governor claimed it by the then existing Act, and ultimately carried off the grand prize to the ruin of some unfortunates whose indemnification would have been as above stated, if the plan as gazetted had been carried out."(33)

"It is unnecessary to dwell upon the exquisite skill manifested by the *junto* in laying out all these *blocks*, or parcels of land, each of which was to return to the fortunate dupe one hundredfold for his liberal or extended views in giving this immaculate (34) screw £1,000 or £1,200 per acre for this water privilege, or rather cemetery, where the last contents of their purses could be deposited, until like ghastly skeletons they should become a cause of regret to every passer-by, and would seem to utter as the winds pass through them—Oh! David! David! David! high rents, rigid exactness, breaches of faith, and doling out bits of land of Albert Town, forming crooked roads, and some other trifles I shall pass over; believing that Scotch Screw and the Dover Driver wormed themselves into such a despicable situation as to become the scorn and byword of everyone conversant with their policy . . . . ."(35)

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(33) It was only fair to state that Governor Gawler withdrew his scheme on receipt of a despatch from the Colonial Commissioners which he took to imply condemnation of his proposals.

(34) A reference perhaps to McLaren's well-groomed appearance, undoubtedly conspicuous amidst a population the males of which could as yet give but little thought to their grooming.

"CINCINNATUS."

We must now revert to McLaren whom we had left in a nervously undecided frame of mind: wishful, on the one hand, to take up extensive Special Surveys on behalf of his Company; but fearful to do so, on the other, lest he should fail to secure the best possible sites in the Province. His personal technical inadequacy in the matter had already been adverted to; and now that he had definitely lost the questionable services of Samuel Stephens, he felt that in the Company's employ, there were but two in whom he could place the slightest confidence in such matters, namely, William Giles, his future successor, and William Randell, his livestock superintendent. Of the former he wrote that whilst he believed him to be "fully competent to pass a sound and enlightened judgment on the quality of the soil" . . . . he knew "nothing of the localities of the country" and could not "boat it and bush it" as anyone competent to choose suitable Special Surveys in various districts of the Province should be able to do.(36) William Randell, on the other hand had scarcely been long enough in the service of the Company to have enabled McLaren to form a just estimate of his capabilities. In the circumstances he determined to cast around him, and endeavour to secure and make use of whatever outside talent might happen to come across his way. One of the first to be approached on this delicate matter was John Morphett who, as had already been stated, had succeeded in securing for McLaren special land reports from Samuel Stephens, but all unknown to the latter. McLaren had thought that since Morphett was not likely to be asked by his English clients to seek out Special Surveys for them, he would be prepared to place his admitted skill and judgment at the service of the Company: but on the latter point Morphett found it necessary to disillusionize him: he had found, he wrote, "upon mature consideration" that he could not accept any such engagement, since he thought it quite possible that he might receive orders for Special Surveys in the near future.(37) The next to be approached was Colonel Light, who with his usual courtesy promised every assistance within his power. Early in April, 1838, Joseph Hawdon who had driven overland the first herd of cattle from New South Wales to South Australia, had been given a wonderful reception on his arrival in Adelaide; and very naturally McLaren was brought into contact with him: and although he declined for unknown reasons to purchase Hawdon's bullocks, first at £25, and subsequently at £22 per head, he did not scruple to cross-examine him closely concerning land settlement matters

William Beavis Randell (1798—1876), First Superintendent of Flocks and Herds of the South Australian Company.

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(35) *South Australian Register*, 3rd December, 1845, page 3, col. 1.
(36) David McLaren to Edmund J. Wheeler, 2nd November, 1837.
(37) John Morphett to David McLaren, 5th April, 1838.

generally; and he even persuaded him to inspect some of the South Australian districts in the company of William Giles, and subsequently to submit his opinions on them to McLaren.(38) Again, when towards the end of August, the celebrated Captain Charles Sturt reached Adelaide with the third overland herd of cattle, McLaren sought his acquaintance and engaged him "to examine the country," he wrote "in different districts for the purpose of guiding me in the important measure of determining me as to the particular place I should call for the Special Survey reserved out of Preliminary Sections." And then, grim forebodings assailed him that perhaps after all he had procrastinated unduly: "how I should be grieved," he continued, "were any other party to obtain a right of Special Survey and anticipate us in the selection of the best districts, Oh! and yet I have not hitherto had means at command which would have justified me in making a selection."(39) On top of this, new causes for alarm arose to beset him: it was persistently rumoured about town that with the connivance of some of the Preliminary Purchasers, the Governor proposed to ignore the Fisher May agreement to the effect that the Reserved Southern District should be surveyed first and before any other districts—and instead to give preference to a New Northern District in which, to McLaren's great alarm, was located the very area which Captain Sturt, for a fee of £100, had confidentially recommended to McLaren as the most suitable in the Province for a Special Survey! Could it be that the gallant Captain had blabbed? McLaren was quite convinced that he had done so for the benefit of the Governor, George Milner Stephen and others: and subsequent events, as we shall see, appeared to confirm McLaren in this opinion. This alarming state of affairs convinced McLaren that the time for masterly inactivity had come to an end: "I am however satisfied," he wrote, "that now is the time to act, and therefore I purpose going thither"—northwards—"next week in the company of Colonel Light that I may personally see the district" and point out its boundaries.(40) Accordingly, arrangements were made to inspect on the 10th November a district which had been recommended by Colonel Light: unfortunately the latter had at the last moment been requested by the Governor as a matter of urgency to complete his survey of the Port River: and the visit to the north had therefore to be postponed until a more favourable opportunity arose.

In the meanwhile the London Board of Directors were themselves becoming restless: they were aware that McLaren had reserved sufficient Preliminary Land Orders to pay for one Special Survey of 4,000 acres; in addition, as far back as June, 1837, they had written out authorising their Manager to secure one or two additional Special Surveys.(41) It was true that subsequently they had acquiesced in McLaren's wish to temporise in the matter: but fifteen months had since elapsed, and they were beginning to feel that unless their Colonial Manager were galvanized into some form or other of activity, the Company that had been first on the scene in the new Province, now ran the risk of being left lamenting, in the rush for land which, according to London information, was about to set in. Hence on the 1st September, 1838, McLaren was informed that in addition to the purchases authorised by the Directors in June, 1837, they now wished him to secure two more Special Surveys; and this request was followed upon the 25th of the same month by a request to be supplied with full information as to what he was doing to secure the Special Surveys authorised by the Board: and notwithstanding their ignorance of local conditions they went to the extent of suggesting suitable localities for Special Surveys, such as the country around Rapid and Encounter Bays, at Lake Alexandrina and on the banks of the Murray, &c. On receipt of these despatches McLaren wrote

(38) David McLaren to Edmund J. Wheeler, 18th April, 1838.
(39) David McLaren to Edmund J. Wheeler, 19th October, 1838.
(40) David McLaren to Edmund J. Wheeler, 7th November, 1838.
(41) Edmund J. Wheeler to David McLaren, 7th June, 1837.

expressing delight at the Directors' determination to increase their landed possessions and promised to give the matter his immediate attention.

McLaren's new determination to act was however hampered by a variety of incidents which kept on interfering with his projected journey northwards; eventually, however, he was able to make a start early in January, 1839, accompanied by a semi-regal escort, worthy of the occasion. How he set out in quest of the *first* Special Survey to be claimed in South Australia, but failed to secure it, must be told in his own words:—

"I set out on 8th instant"—January, 1839—"to the northwards in company with Colonel Light, Mr. Finniss, Mr. Samuel Stephens, Mr. Randell, and Mr. Mann.(42) It was thought that it would be necessary in order to secure a Special Survey in any compact district, that the boundaries should be stated geographically in their latitudes and longitudes, and bearings, &c., from known objects, such as Mount Lofty, &c. Not only did Colonel Light recommend the Company towards the north, particularly on the banks of the Para River, in preference to the Mount Barker district; but so did Mr. Finniss on the first return from the latter district; and Captain Sturt expressly stated the former to be preferable to the latter. After going thither I was very much surprised to find that the district recommended by Captain Sturt offered no inducement whatever. Colonel Light strongly recommended the land on the banks of the Para, in which Mr. Finniss concurred, chiefly in consideration of the locality as likely to be the high road to the Murray, and offering considerable advantages in respect to land, water, &c. Their recommendations, strong as they were, and although followed by the assurance on their part that if I did not secure it to the Company it would be immediately taken by another party, failed to convince me of the propriety of that measure, and in this view of the case I concurred with Mr. Stephens and Mr. Randell. We afterwards proceeded further onwards to a district visited last year by Mr. Stephens, Colonel Light, etc., and named by them Lyndoch Valley. On arriving there all difference of opinion ceased, and the unanimous and decided opinion of all was that I should claim a Special Survey there. I hope to enclose a formal report of Messrs. Light, Finniss & Co., of our operations as to Lyndoch Valley, and I believe I do not overstate the case when I say that I believe we have got one of the richest

Bank of South Australia, North Terrace, Adelaide.
(From a drawing by Col. Light, 1839).

(42) Messrs. Light and Finniss were members of the Land and Survey Firm of Light Finniss & Co.: Samuel Stephens was the Company's late Colonial Manager, whose resignation McLaren had accepted early in 1838, and with whom he declared that he could no longer work; William Randell was a capable Superintendent of livestock: and Charles Mann was the volatile ex-Advocate-General and now legal adviser to the Company.

valleys in the neighbourhood for agricultural purposes, surrounded by most beautiful rising grounds fitted for farm-steadings, sheep stations, or country residences; with very extensive and excellent sheep runs all round, and a first (rate) supply of water naturally to be had, or at very little expense all the year round. The distance from the town is about 25 miles in a direct line over comparatively level country, intersected only by some gullies which in the meantime are quite dry. Its locality also for the transit of wool to Port Adelaide adds considerably to its value; and if the idea of Colonel Light be realised, and the high road to the Murray go that way, it will give by and by an additional value and importance to it.

"We afterwards extended our operations to the Head of the Gulf in quest particularly of the large river reported to have been found in that quarter by Mr. Strangways, and named by him the 'Gawler.' We found no river, and although there are some deep ravines in which water is found in pools, I am persuaded there is no river in the country over which we passed, nor any land suitable for a Special Survey.

"We returned to town on the 14th"—January—"to attend the important meeting at the Land Office on the 16th as to the selection of the land at the New Port; and with the resolution of proceeding on 17th to the Mount Barker district, in which Mr. Stephens and Mr. Randell concurred in representing as being very superior as a district, particularly for grazing cattle.

"On my return I was grieved to find that a Special Survey had been claimed in that quarter by Mr. Dutton lately arrived from Sydney. He pointed out the district in the most vague terms imaginable, namely, as in the Mount Barker Valley, including the cattle stations of Messrs. Hack and Mr. Finniss. From Mr. Randell I learnt that some very rich land and well watered was about five miles distant from Messrs. Hack's station, and in which it was thought Mr. Dutton would not include even in the survey of 15,000 acres; and could not secure in the 4,000 acres, provided he included, as bound to do, Messrs. Hack and Mr. Finniss's stations."(43)

And thus was brought to a close the race for the acquisition of the *first* Special Survey in South Australia which was secured at Mount Barker, then considered the pick of the land of South Australia, by William Hampden Dutton, a pastoralist of New South Wales: the second prize going to the South Australian Company. How these two acquisitions led to an inrush of buyers of Special Surveys so characteristic of 1839 will be shown in a subsequent chapter.

APPENDIX VII.

SEQUENCE OF EVENTS THAT LED TO THE FOUNDATION OF PORT ADELAIDE AT ITS PRESENT SITE.

It seemed desirable to give in greater detail the sequence of events that led to the removal of the Port of Adelaide from Colonel Light's original landing place to its present site. We were told that the original site had been "selected as offering greater facilities of access to hard ground from the River than any other spot in the immediate neighbourhood,"(1) and manifold as were its apparent disadvantages, it was not necessary that we should accept George Stevenson's ill-natured dictum to the effect that "when the present site"—*i.e.*, the Old Port—"was fixed upon by the Survey-General"—Colonel Light—"it was intended *at least by him* to remain the permanent port of Adelaide."(2) Stevenson, no friend to Light, but deeply conscious of the urgent necessity of an early change in the chief landing-place of the Province, seized upon the opportunity to brand Light with incompetence and render him personally responsible for the greedy folly of his—Stevenson's—clever friends who rather than invest their Preliminary Land Orders like other folk in valuable city acres, threw them away upon "the barren sandhills of the vicinity" of the Port. But B. T. Finniss, Light's chief Assistant-Surveyor and a competent eye-witness from the earliest days of settlement, was very emphatic on this point: "I recollect," he wrote, "the time when Colonel Light endeavoured to dissuade the colonists from choosing their town acres at the Port, telling them that the wharfage and approach could only be rendered available by an outlay of capital far beyond the means of any individual. In consequence, out of 437 Land Orders only 29 Sections"—one-acre Sections—"were chosen at Port Adelaide—not where Colonel Light had marked out the ground, for he would not mislead the people by marking out any at all. It was left to themselves, when they had

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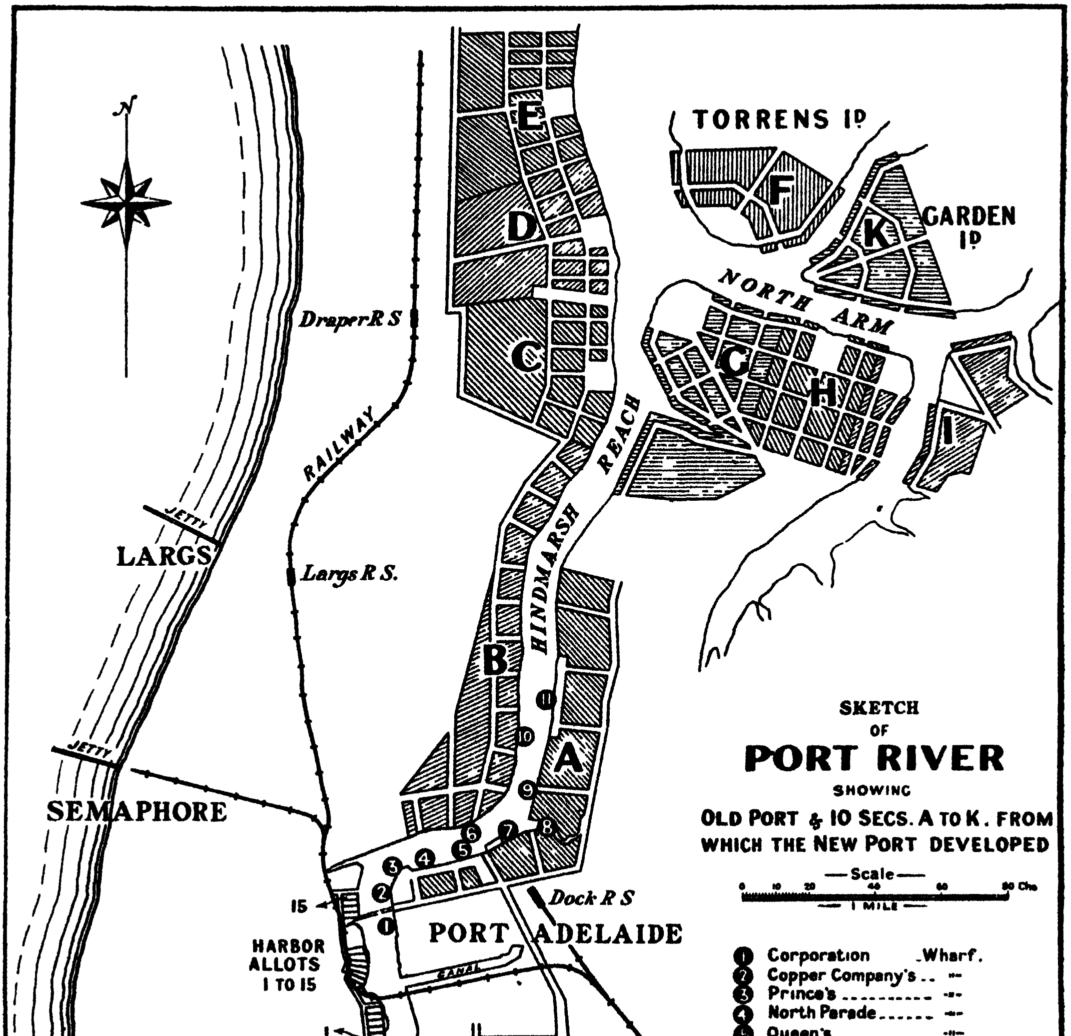
(43) David McLaren to Edmund J. Wheeler, 26th January, 1839.

(1) *Reminiscences of the Old Port*, by Edward Holthouse, page 1, manuscript in South Australian Archives.

(2) *South Australian Gazette and Colonial Register*, 1st December, 1838, page 3, col. 4.



determined to abide the speculation, to state what part of the harbour they preferred. His advice, again, as in all other matters, was in requisition—and he told them 'there is only one landing at present, where ships must of necessity discharge their cargoes, on account of the swamps which prevent approach to the water side in any other spot . . . . Years must elapse and thousands of pounds be expended, before they can discharge and remove goods inland from the deep water, lower down the harbour—choose, therefore,'—if choose you must—'the only available spot, *the dry land.*' What has been the result? Public traffic has followed that line, and many thousands of tons of goods have passed from the Port to Adelaide—not because Colonel Light ordered them to do so, or the proprietors of the harbour sections, but because nature compelled them. If the owners of all the imported property of the colony could have found an easier and more practicable line, they would assuredly have done so, in spite of the Surveyor-General, and in spite of the proprietors of the harbour sections. Colonel Light could not overleap the exigencies of the Colony for fifty or one hundred years, and lay out plans which can only follow in the wake of an unbounded prosperity."(3) It would appear, therefore, that to persons who had determined to have their own way and take up land at the Port rather than in the capital city, the advice given by Light was in the circumstances the wisest that could have been given: the only error of judgment which he appeared to have made, consisting in an under-estimate of the future rate of progress of the colony: but as any error in this connection could not have deflected these land speculators from their purpose, it cannot be accounted an "error" from the standpoint of sound advice.

We shall leave it to a local eye-witness to give some details as to what were the disabilities of the Old Port. "The locality of the Old Port lies about a mile above the Jervois Bridge, and nearly opposite to what is now known as 'Buck's Flat.' . . . . Across"—the mangrove swamp—"a ditch was cut in a straight line to the foot of the sandhills, and was piled at this end with pine poles capped with quarterings, and backed behind with tea-tree bush to prevent the sand from falling in. This ditch was about 30 feet wide by 5 feet deep. The silt dug out in its formation was thrown up on one side which formed an embankment or parapet about 10 feet broad and two feet high. This creek was only available for small craft of light draft, and was so narrow as scarcely to admit of one boat passing another, except at high water. At low water it was dry, as also were the mud flats surrounding its entrance. As there were no mechanical appliances for landing heavy goods to this strip of a wharf, it can readily be imagined what irritation was caused to Captains by the delay attending the unloading of their vessels; and the fights and scrambling amongst rival crews and lighter men on these occasions to get out of the creek before being neaped by the ebb. Fortunately for Jack policemen were scarce and fines and costs not then in vogue. These annoyances to Captains and sailors were, however, trifles compared with the losses sustained by shippers and consignees. . . . . Vessels with their cargoes followed one another in such rapid succession that at times the wharf became completely choked from end to end with stacks of flour, bags of potatoes and other miscellaneous merchandise, where it remained for days together, exposed to the weather till removed by bullock-drays to Adelaide, the cost of which was £3 per ton. During these intervals of delay it seemed as if time and tides exercised their traditional prerogative to wait for no-one, for the tides would rise foot by foot till the entire wharf lay under water. The receding tide was no less mischievous. It carried back with it everything that was light or floatable; and if my memory serves me it appeared to be a recognised custom when these disasters occurred for any owner of a dinghy or a cockle-boat to put off to sea on a voyage of discovery, and who never forgot to ship a boathook as essentially necessary to ensure a prosperous cruise. . . . After the subsidence of these high tides the narrow footway between the goods stacked on the wharf and the edge of the creek was rendered so slimy and slippery that pedestrians had to hang on to crates and cases to avoid a ducking. The teamsters fared no better for the only access they had to the goods was by going through the swamp at the rear of the wharf, and backing their drays' 'tails' on to the embankment. This was an easy matter with an empty dray; but the tug-of-war came when a start was made with a heavy load on. Here and there a dray might be seen sinking over the felloes and down to the axle in mud. . . . . There was, however, in those days, a generous and manly feeling amongst bullock drivers, most of whom had come over from the other side, as stock drivers, or teamsters, with the herds brought by the overlanders. There was a sort of fraternity begotten of fellowship in bondage. They were ever ready to give a helping hand to a mate in difficulties, and would hitch on their bullocks to his team and drag him out bodily. But many a trusted dray-pole came to grief on these occasions."(4)

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(3) *The Southern Australian*, 20th October, 1838, page 3, col. 4.

It was conditions such as these that faced Governor Gawler when he first assumed office in South Australia—12th October, 1838—conditions which had become obvious to all—even to those with vested interests at the Old Port—and it was acknowledged by all that the latter had played out its day and could no longer meet the requirements of "the increased and increasing shipping of the Colony": nor was the new Governor slow to realise that "a more commodious harbour" had become "an absolute necessity" for the Colony.

His first step to this end was taken on 10th November, 1838—*i.e.*, less than four weeks after his arrival in South Australia—when the public was notified through the *Gazette* that the Governor had "determined upon . . . opening a temporary road through the mangrove swamp to the probable future port of Adelaide" on 14th November. "In an attempt so intimately connected with the future prosperity of the Colony" the Governor stated that "he would be happy to have the assistance of any of the colonists who" would "do him the favour to attend. For those who" would "really join in the work under the direction of the surveyors, rations "would "be provided near the South West point of the North Channel."(5) According to McLaren, who accompanied the party, "the proposed road" through the mangroves "was found" to be "impracticable, but the Governor" was "decidedly convinced that the site of the Port must be changed, and therefore he" had "suggested a new landing place separated from the one" previously "proposed . . . . by a creek 200 yards or so wide, across which a bridge or ferry would be required." The Governor, continued McLaren, asked him "and several other gentlemen to accompany him"—the Governor—"thither yesterday"—19th November—and this accordingly was done.(6) During the course of this tour of inspection, the Governor disclosed to those who had accompanied him, the plan he had formed for the successful launching of a new port at the proposed site. Curiously enough, some ten days later—on 1st December—there appeared in the closing paragraph of a lengthy editorial article in the *Register*—the main portion of which was devoted to proving that Colonel Light and J. H. Fisher were solely responsible for the Old Port and all its shortcomings—a general outline of the Governor's proposals, but presented in such a way as to give it all the appearance of a product of George Stevenson's cerebration. "The plan that suggests itself, in preference to a Special Survey, or to any other course, is to allow an individual—the Governor, for instance, in his private capacity, if he would condescend to undertake so much trouble—or any committee of settlers chosen by the public, to purchase 640 acres on the spot, where the harbour is to be placed. When the purchase is effected, the site of the town properly laid out, and the wharfs, public walks, &c., reserved, the allotments to be gradually sold to the public. The money thus realised—and its amount would be enormous—after defraying the original cost and expenses, to be applied to forming approaches, streets, and to the general improvement of the place."(7) This article might possibly have been officially "inspired"; or it might have been an extraordinary coincidence of two great minds running in ruts: but more probably a brazen attempt to steal the Governor's thunder. In any event it led to the almost immediate issue of a "*Gazette Extraordinary*" in which among other things was given an official statement of the Governor's proposal over the signature of George M. Stephen and George Hall in the following terms:—

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(4) *Reminiscences of the Old Port*, by Edward Holthouse, page 1. Manuscript in South Australian Archives.

(5) *South Australian Gazette and Colonial Register*, 10th November, 1838, page 1, col. 2.

(6) David McLaren to Edmund J. Wheeler, 20th November, 1838.

"His Excellency the Governor and Resident Commissioner, requests the attention of the colonists of South Australia to the following considerations:—

"1. However necessary it might have been at the first settlement of the Colony, to have fixed the authorised landing place in its present situation, yet, in the now highly advanced and rapidly advancing state of society, that situation has become most inconvenient, discreditable, and injurious to the public interests.

"2. About four miles further down the river, at the point at which the Northern Channel joins the main stream, there is a beautiful, very secure, and very commodious harbour. Ships can beat up either to or from it without danger, and as the water is deep inshore, cargoes can be discharged at all times of the tide. His Excellency desires with the unanimous co-operation of the colonists to establish a new port near this point.

"3. The situation is so peculiarly desirable that it was thought of at a very early period; but the difficulties with regard to the surrounding land were then too great to be encountered.

"4. In high tides the ground to a considerable extent is covered with water, but the land is almost everywhere solid. It is not properly to be called a swamp. Almost everywhere it will without any extraordinary precaution, support roads and buildings. A very great number of the most flourishing ports in the world have been erected in much worse situations. There exists no difficulty that the enterprising spirit of our colonists, in the present state and prospects of the Colony, is not able to overcome.

"5. Individual exertions however, would be of no avail; combination of effort is absolutely necessary; and His Excellency proposes the following plan, in his opinion the most simple and effectual towards the attainment of this object.

"That from 500 to 1,000 acres at the proposed situation should be immediately surveyed and put up for sale in accordance with the regulations; and that His Excellency the Resident Commissioner should be allowed to purchase this land, with his own private funds, at the regular price without any competition on the part of the colonists.

"That after the ground shall have been properly laid out into convenient lots for a Port Town, and due and sufficient notice given, these lots shall be put up singly to auction and sold to the highest bidders.

"That from the fund thus formed, the Resident Commissioner shall forthwith withdraw the money advanced by him with bank interest, and place the whole of the residue in the hands of a committee, to be elected by the holders of the Port lots.

"That this residue, under the direction of the committee, shall be applied to specific general purposes, essential to the establishment of the Port, such as the making of a great road across the mangrove swamp, the construction of a bridge, the raising of embankments, the cutting of main drains, &c.

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(7) *South Australian Gazette and Colonial Register*, 1st December, 1839, page 3, col. 4.

"To the holders of the 29 Town Acres at the present Port, and of sections with road frontage on the present Great High Road, would be given the option of exchanging their present lots for lots at the new Port, and their present sections on the new line of road.

"Up to the period of the concluding sale by auction, no risk would be incurred but by the Resident Commissioner. That risk His Excellency is willing to undertake; having convinced himself by close examination, that the situation referred to is most peculiarly marked out by nature as the port, and that, in this free and commercial country, nothing can long prevent it from being there established." (8)

In these statesmanlike suggestions of Governor Gawler we had the outline of a plan which, had it been adopted, must inevitably have led to early and prosperous development of the New Port: in his own words, "if the suggestions I threw out had been acted upon two very great objects would have been gained: the public generally would have been interested in the new port, and a sufficient sum of money, I am fully persuaded, would have been raised to give it a good commencement." (9)

The committee "elected by the holders of the Port Lots"—*i.e.*, a body corresponding in fact to the ratepayers of established towns or cities—to administer the net surplus money available from the auction sales of these same lots, would have been the starting leaven of municipal administration in the Province, and would have contributed to its early development upon sound democratic lines. How was it then that so admirable a plan should have failed of acceptance? Governor Gawler's statements in the matter and his subsequent actions have left the answer to this question more or less in doubt: in the despatch already quoted (9) he stated to Rowland Hill: "In the meantime, however, your letter (10) . . . arrived containing the expression of the strong disapprobation of the Commissioners at the reservation of Secondary Towns and . . I gave up at once all intention of putting up the New Port to public auction, and thus removed the only barrier that was likely to prevent the exercise of the immense monopolising powers of Preliminary Purchasers." (11)

Although this statement of Governor Gawler appeared to be precise and definite enough—and indeed it was intended to do so—nevertheless it cannot be said to have disclosed the real reason—the only reason that could have made Governor Gawler's decision to withdraw inevitable: and as such, it must be looked upon as little better than a diplomatic device calculated to impress the Commissioners with the sincerity of the Governor's desire to meet their wishes, wherever and whenever practicable. Actually, from the standpoint of the Act, and the Commissioners' Regulations, there was nothing in Gawler's proposals for the New Port that was illegal, or that called for withdrawal. It was proproposed that 500 to 1,000 acres of land on the Port River should be surveyed, and presumably divided into 80-acre sections, with due allowance for necessary roads; and that subsequently such land should be duly proclaimed for purchase by tender: both of which proposals were in strict keeping with the requirements of the Land Regulations. But by common consent, there was to be one tenderer only, namely, the Governor's nominee, probably his Private Secretary—George Hall—who at a later date acted in a similar capacity when the Governor wished to become interested in a Special Survey. (12) There did not appear to be anything illegal in such an arrangement, unless it could be claimed to amount to a

(8) *Gazette Extraordinary*, 5th December, 1838, col. 3.
(9) Governor Gawler to Rowland Hill, 16th February, 1839.
(10) Rowland Hill to Governor Gawler, 1st September, 1838.
(11) Governor Gawler to Rowland Hill, 16th February, 1839.
(12) David McLaren to Edmund J. Wheeler, 20th November, 1839.

conspiracy of the Governor and the people of South Australia not against the Commissioners' legal rights, but against their ill-advised wishes: and if such were indeed the case, there could be no question as to which of the twain would ultimately prevail. It was for the latter reason therefore that Gawler's statement to the Commissioners must be characterised as lacking in frankness: he did not withdraw his proposals in deference to the Commissioners' wishes, but because due to the machinations of McLaren, he was unable to secure for his proposals "that combination of effort" for which he had postulated: or in other words, he had been given very definitely to understand that there would be more than one tenderer for the New Port Sections; and that as some of the prospective tenderers held Preliminary Land Orders, the land would have to be divided into 134-acre Sections intead of 80-acre Sections. It was also clearly manifest to the Governor that holders of Preliminary Land Orders reserved for District "A" could outbid any tenderer that he might put forward on behalf of his New Port plans.

The accuracy of the above viewpoint was confirmed by the following official notice over the signatures of George M. Stephen and George Hall, acting as Assistant-Commissioners: "Notice having been given to the Resident Commissioner by some of the Preliminary Purchasers, who had reserved for District "A" that they intended to claim their choice of Preliminary Sections at the new port, sections of 134 acres each, have been marked out for them and they are requested to make their selection at the Land Office on 16th instant—11th January, 1839." (13)

Of the closing phases of this little drama, Governor Gawler stated that "McLaren was the first of the Preliminary Purchasers to claim in opposition to the plan which" he had "proposed to the public, the right of selection at the New Port. For this act he" was "perhaps not to be blamed; the sacrifice to public advantage would have been a very great one; and valuable as the new sections" were "the risk of other Preliminary Orders taking advantage of forbearance on his part was considerable." Governor Gawler "did not blame" McLaren, "but gave way at once to his request." It was much to be feared, however, that he had no legal alternative but to act as he did, although recognising that the public could hold "no expectation that land belonging to the" South Australian Company would "be disposed of here"—*i.e.*, at the New Port —"with liberality and public spirit." (14)

Eventually, on 16th January, 1839, the 10 New Port Sections were put up for tender and allotted as follows:—

Section "A"—The South Australian Company.
Section "B"—John Abel Smith.
Section "C"—R. G. Symonds.
Section "D"—The South Australian Company.
Section "E"—John Morphett.
Section "F"—R. G. Symonds.
Section "G"—T. B. Strangways.
Section "H"—R. G. Symonds.
Section "I"—H. G. Hewett.
Section "K"—The South Australian Company.

And it was in this fashion that the New Port, over which Governor Gawler had wasted the glamor of utopian dreams, fell eventually into the hands of private enterprise, represented in the present instance by the South Australian Company, in virtue of immediate ownership of Sections "A," "D," and "K," subsequent purchase of Section "I," and 14 years' lease of Section "B." It cannot be denied, however, that the energy and enterprise of the Company in taking immediate steps to build a road across the swamps, in erecting efficient wharf and warehouses, although in the main dictated by the fear of competition from the owners of other sections, did nevertheless much towards giving the New Port an auspicious start in life. But the road, eventually, was paid for by the Government with a free grant of land: and wharf and warehouses did more than pay for themselves in the ordinary way of business. And this no doubt was as it should have been: but whether such revenue-earning expenditure could justify David McLaren's claim for the Company as being "*preeminently the benefactors of the Colony*" (15) was obviously quite another matter: and judging from the animadversions of "Cincinnatus" some five or six years later, the claim would appear to have failed ignominiously. (16)

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(13) *South Australian Gazette and Colonial Register*, 12th January, 1839, page 1, col. 3.
(14) Governor Gawler to Rowland Hill, 16th February, 1839.

(15) David McLaren to Edmund J. Wheeler, 11th May, 1839.

(16) *South Australian Register*, 3rd November, 1845, page 3, col. 1.

(*To be continued.*)

Does it Pay to Grow Wheat on the Millicent Flats.

[D. McCord, Millicent.]

It will be argued by many that wheat cannot be profitably grown, and that barley is a better proposition. In the first place, there is a world market for wheat, and providing it is f.a.q., it can always be sold. Barley has not always an overseas market, hence one takes whatever price the brewers are prepared to give. I see no reason why wheat sown on well worked ground, preferably grass land, and ploughed before early rains if possible, should not pay as well as barley. Barley has its failures in the way of grubs, which are likely to get nearly all the crop, while they do not attack wheat as much, if at all. The first thing is to find out which variety of wheat is less susceptible to rust, and in this I find Nabawa and Ghurka seem to be more immune than other wheats. Wheats are not sown early enough. Wheat takes longer to grow than barley, and if put in early, gets a good growth before early summer rains, and is more forward. Damp nights and early morning sun and lack of wind allow the dew to settle on the flag and stem, generally causing rust. My argument about sowing early is that through sowing wheat mixed with oats for hay I have never seen rust affect the wheat in a hay-crop.

Discussion.

Mr. A. Sapiatzer said that in his thirty years' experience of cereal growing, he had found wheat the most profitable. It was nearly always from sixpence to ninepence per bushel higher in price than barley. He had found Ghurka the most rust resisting variety. He tried all times for planting wheat, and was of the opinion that if a start with drilling was made early in September, it was quite early enough. Planting early tended to produce a soft grain, whereas by planting late a good, hard grain was harvested.

Mr. G. Major said that buyers did not offer any higher price for the hard grain than they did for the softer.

Mr. L. C. Hutchesson said that the hard grain always weighed heavier.

Mr. C. G. C. Skeer was opposed to the views given by Mr. Sapiatzer as to which was the more profitable cereal to grow. He said that the straw stubble left by the barley was three or four times as valuable as that left by wheat. The Millicent soil was not generally suitable for wheat growing.

Mr. Major said that probably Mr. Sapiatzer's ground was more suitable for wheat than the average. but he thought that most of Millicent soil was more suited for barley growing.

Agricultural Bureau of South Australia

48th Annual Congress

The appointment of 413 delegates eclipsed last year's record attendance of 404, and the Way Hall was not large enough to accommodate the crowd of members of the Bureau and visitors who attended the opening session of the Congress on Monday, 13th September.

At the suggestion of the Chairman it was decided to send a message of goodwill to His Excellency the Governor who with Lady Dugan is on a visit to England.

In the absence of His Excellency the Governor, the opening address was delivered by Hon. A. P. Blesing, M.L.C. (Minister of Agriculture). Mr. S. Shepherd (Vice-Chairman of the Advisory Board of Agriculture) gave a report of the activities of the Board and the Bureau during the past 12 months and a travel talk illustrated with lantern slides: "Some recent phases of farm life in Germany and Russia" was given by Mr. C. A. S. Hawker, M.H.R.

On Tuesday morning the following papers were read and discussed:—"Suggestion for Improvement in the keeping of Farm Poultry," Mr. C. F. Anderson (Chief Poultry Adviser); "Milk Production for the Manufacture of Cheese," Mr. H. B. Barlow (Chief Dairy Instructor); "Re-working Orchard Trees," Mr. H. N. Wicks (Member of the Advisory Board of Agriculture and the Balhannah Bureau); "Orchard Soils and Fruit Tree Nutrition," Mr. A. G. Strickland, M.Sc. (Chief Horticulturist). In the afternoon Mr. C. T. McKenna, B.V.Sc., M.R.C.V.S. (Veterinary Officer of the Stock and Brands Department) spoke on "Infectious Entero-Toxaemia and Internal Parasites of Sheep"; Mr. C. A. Goddard (Assistant Instructor in Wool Classing at the School of Mines read a paper. "The Wool Industry;" and Mr. T. H. Borgas, of Booleroo Centre, with the aid of diagrams, explained "Some Additions to the Fallowing Plough." The evening session was occupied with an address by Mr. R. C. Scott (Chief Agricultural Adviser), "Some Points in Wheat Growing."

Wednesday morning was devoted to Free Parliament, and in the evening Mr. W. J. Spafford (Director of Agriculture) gave an address illustrated with lantern slides, "Some of the Peoples of the South."

On Thursday morning, delegates under the guidance of Dr. Richardson and officers of the staff inspected the Waite Research Institute.

Delegates.

The following Branches appointed delegates and the figures indicate the number of sessions for which attendances of delegates were recorded:—Adelaide—J. Hudd (2), J. Hewland (2); Alawoona—P. Masters (4), P. Paull (4); Allandale East—W. Parish (3), A. Earl (3); Appila Yarrowie—T. Lange (6), R. Wurst (1); Arthurton—P. Ford (1); Balaklava—C. March (1), G. Whiting (2); Balhannah—H. Rollbusch (5), C. James (1); Balumbah—A. Swan (5), H. Ellis (4); Baroota—S. Stone (1), W. Spencer (3); Beetaloo Valley—J. O'Shaughnessy (4); Belvidere—S. Wakefield (2); Berri—P. Ingerson (3), T. Wilkinson (5); Blackheath—A. Jones (4); Black Springs—A. Heinrich (4), E. Siegert (3); Blackwood—C. Eglinton (2); Blyth—A. Schulz (3), K. Zweck (3); Booborowie—A. Fairchild (3); Booleroo Centre—T. Borgas (2); Blewett Springs—A. Air (1), G. Air (2); Boor's Plains—C. Rodda (1); Borrika—E. L. Cowled (4), E. H. Cowled (3); Brimpton Lake—J. Clothier (4), P. Wagner (1); Brownlow—N. Woithe (4); Buchanan—W. Hansen (3); Bute—E. Harris (3); Butler—G. Woolford (4); Cambrai—L. Royal (2), H. Stevens (1); Chandada—J. Travers (6), J. Reidy (3); Chapman's Bore—R. Ackland (3); Chilpuddie Rock—A. Cox (3), H. Frost (4); Clarendon—L.

Spencer (1), T. Brooks (1); Coomandook—F. Ballard (4), W. Trestrail (4); Coonalpyn—J. Cronin (5), C. Todd (4); Coonawarra—K. Allder (4); Cungena—H. Patterson (4), M. Quinn (3); Devlin's Pound—A. Robertson (3), R. Loffler (4); Dudley—R. Henderson (2); Echunga—F. Wickham (3); Eurelia—S. Manning (2), M. Daly (4); Frayville—G. Quast (1), W. Faehrmann (1); Gawler River—F. Wormald (3), J. Roediger (2); Gladstone—E. Phillips (5), C. Bennett (4); Glencoe—D. Dow (5), F. Sims (6); Geode—P. Lange (4), J. Kelly (6); Green Patch—B. Ritchie (4), T. Derrington (3); Hanson—A. Riggs (2), C. Dixon (3); Hartley—F. Pope (5); Hilltown—M. O'Halloran (3); Jamestown—A. Symonds (4), C. Hewett (4); Jervois—T. Ely (3), P. Hutchinson (3); Kalangadoo—C. Leeder (4), R. Messenger (4); Karte—A. Bierworth (4), G. Trowbridge (3); Keyneton—M. Evans (1); Ki Ki—O. Blucher (6), R. Watts (4); Kilkerran—G. Heinrich (2), B. Koch (5); Kingston—R. Hill (1), G. Downing (3); Koolunga—J. Sykes (4), G. Jones (4); Koonunga—F. Schulz (4), H. Mibus (4); Koppio—H. Gardner (5), V. Gardner (4); Kyancutta—T. Knight (5), L. Daniel (5); Kybybolite—H. Naylor (3), J. Heffernan (5); Laura—H. Lines (5), V. Pech (3); Laura Bay—A. Dixon (5); Light's Pass—C. Verrall (6), T. R. Roenfeldt (4); Lipson—M. Barraud (4), C. Partington (1); Lone Pine—E. Hentschke (4), H. Stopp (3); Lyndoch—E. Evans (4); Maltee—V. Schwarz (5), T. Bassham (5); Mangalo—W. Munday (4), H. Olsen (5); Marama—T. Hinkley (6); McLaren Flat—M. Kelly (3); Milang—J. McCarthy (3); Millicent—D. McCord (4), J. Wilson (4); Minnipa—S. Billinghurst (4); Monarto South—C. Altmann (5); Moorook—S. Perkins (3); Morchard—J. Nottle (4), A. Piggott (6); Mount Barker—H. Hunt (1), P. Wise (2); Mount Bryan—H. Griffen (4); Mount Gambier—E. Tollner (6), F. Lock (6); Mount Pleasant—J. Buckley (3), R. Smith (2); Mudamuckla—W. Reinke (6), A. Watson (3); Mundalla—D. Hamilton (5); Murray Bridge—A Wells (5), W. Goyder (2); Murraytown—A. Scholz (3), E. Pitman (6); Murraminga—F. Roberts (2), J. Hunt (3); Nantawarra—M. Hamdorf (3), C. Belling (4); Narridy—H. Threadgold (5), J Klingner (4); Nelshaby—F. De Silver (4), H. Noll (4); Nunjikompita—P. Leustner (3), S. Lang (4); Nunkeri—E. Peltz (3); O'Loughlin—E. Pfieffer (4), R. Linke (3); Owen—A. Helps (3), C. Marshman (1); Parilla—J. Carman (4), A. Weldon (4); Parrakie—W. Halliday (3), F. Gravestocks (3); Paskeville—M. Price (6), J. Pontifex (2); Penola—E. Hinze (6), T. Aitken (4); Penwortham—P. Modystach (3), A. Wayman (3); Petina—W. Schultz (4); Pinbong—E. Scholz (4), D. Scholz (5); Pinkawillinie—F. Freeth (3); Pinnaroo—G. Hawthorne (4), A. Young (3); Poochera—W. Gosling (4), C. Bohlin (5); Ramco—J. Boehm (5); Redhill—L. Harris (4), J. Dundon (4); Renmark North and Chaffey—J. Brigham (3); Riverton—T. Longbottom (3); Roberts and Verran—R. Pedler (5), G. Pedler (5); Rosedale—R. Needle (4); Saddleworth—A. Jones (4), F. W. Coleman (2); Shoal Bay—W. Turner (5); Snowtown—G. Freebairn (3), P. Julge (2); Strathalbyn—R. Sissons (5); Summerfield—J. Bortroff (4); A. Law (2); Sutherlands—A. Twartz (6); Tantanoola—G. Altschwager (2), J. Altschwager (3); Taplan—W. Hammond (6); Taragoro—B. Crabb (6), J. Crooks (5); Tatiara—F. Densley (4), A. Milne (4); Ungarra—C. Tillbrook (4); Upper Wakefield—G. Simon (3); Waikerie—W. Harden (4); Wallala—F. Agars (6); Wandearah—L. Jacobs (3), E. Sinclair (4); Warcowie—N. Crossman (5), B. Telfer (4); Warramboo—A. Collins (4), A. Patterson (5); Wasleys—E. Day (2); Weavers—E. Giles (3); Wepowie—J. Burns (5), A. Whibley (3); Whitwarta—S. Sellers (2); Williamstown—A. Leske (5); Willowie—J. Barrie (4), R. Stone (5); Wilmington—M. Christophersen (4), C. Cole (5); Wirrabara—L. Hollit (5), O. Jaeschke (5); Wirreanda—J. Murphy (3); Wolseley—E. Sharrad (4), H. Pilgrim (5); Wudinna—C. Pascoe (3), C. Johns (4); Yundi—J. Guiney (2); Yurgo—A. Burton (3), G. Tregilgas (4).

The Minister's Address.

It is my pleasure to declare this Congress of Members of the Agricultural Bureau open for the consideration of the many

agricultural problems which are being brought before the gathering during the next two days. In such a favourable season as we are experiencing this year, it is a particular pleasure to be associated with primary producers from all parts of the State, because the outlook for crops and livestock is so very much higher than it has been for some years. Not only have prices of rural products returned to an economic level, but seasonal conditions are so favourable that we can be reasonably certain of really good crops of wheat and other cereals, and returns from livestock are assured. The agricultural conditions obtaining at present are so much improved on what they have been for several years in succession, that producers can face the future with the hope which makes living a pleasure, and which leads to the adoption of progressive ideas and practices.

CROPS.

In looking back over the period of depression, which from the crop-grower's point of view consisted of a series of years of low prices, as well as a run of years of relatively poor yields, the outstanding fact is that despite the disabilities that the growers of wheat had to contend with, the average wheat yield of the State was maintained at a figure very close to what it had reached in pre-depression days. This performance speaks volumes for the modern crop-growing methods adopted by farmers, and the great skill displayed in their cultural practices, and surely presages an increase in our wheat yield when we again experience a series of good seasons.

Not only has the average yield per acre of wheat been maintained to a remarkable degree during the poor seasons, but the quality of the grain produced has been considerably improved.

The activities of the Wheat Improvement Committee have already borne fruit, for there has been a large area sown to new wheats of good baking quality, and poor quality varieties which were becoming too popular have been discountenanced, and a great reduction in the area sown to them has been the result. This question of keeping up the quality of our most important primary product—wheat—is of paramount importance, and I sincerely implore all wheat-growers to keep the matter in mind at all times.

Another matter of the greatest importance in connection with wheat-growing is to remember that in a climate such as ours, economic returns from wheat crops can only be secured if land which has been under cultivation for a few years is properly bare-fallowed each time it is to be cropped with wheat. It is a fact to be deplored that even after our fairly long experience of the results to be secured from wheat crops grown on fallow as compared with those received from crops on unfallowed land, that about 30 per cent. of the wheat crop of the State is still grown on unfallowed land. Eyre's Peninsula and the Murray Mallee are the two districts where this practice of trying to grow wheat without working the land as bare fallow is persisted in, and until the position is corrected the best will not be got out of this farming country, and financial disaster will continue to be a common occurrence.

Of other crops it appears that we are in for a record yield of barley this year, and as the quantity of this grain required for malting purposes is very limited we are almost certain to have a large surplus of barley on hand after harvest. Fortunately, the export market for pigs is still very favourable, and as no grain produces a better pork or bacon than does barley, its use for this purpose should prove economic for farmers, and of considerable advantage to the State.

I take advantage of this opportunity to draw the attention of primary producers to the fact that the Department of Agriculture is doing everything possible to encourage the production of small agricultural seeds, and with this object in view is certifying seed grown and harvested in the State, and because other places where we have good customers, and notably New Zealand, are demanding special fumigation of seeds before they will admit them into their respective countries, Government is providing a Hydro-vacuum Fumigation Plant for treating seeds to be exported. Large quantities of seed of Subterranean Clover, Wimmera Rye grass, *Phalaris tuberosa* and Lucerne were certified last year, and as the certificate is given to the extent that the seed was grown on a field free from bad weeds, and shows the percentage of seeds of other plants present, it behoves all who intend sowing any of these pasture plants to insist on securing certified seed to ensure clean, healthy crops.

Whilst dealing with crops I cannot allow the opportunity to pass to remind you that every effort should be made to store fodder against the recurrence of times of shortage. The luxuriant growth this year means that a great bulk of fodder can be cut from a relatively small area, and advantage should be taken of the position, and silage and hay should be manufactured in quantity on all farms on which livestock are maintained.

LIVESTOCK.

Besides proving very favourable for crops, the season has been particularly propitious for the growth of pastures and forage crops. During the early months of the year good rains were received over the great bulk of the pastoral country, and as sufficiently good follow-on rains have been recorded periodically ever since, a transformation has been wrought in these areas, and much of the country which has been bare and wind-swept for some years (in a few cases for upwards of 20 years) is now covered with edible bush and grasses. Should we be fortunate enough to get a recurrence of such seasons for a few years on end, bare land will be unusual in the pastoral country except on the gibber plains and other stony places.

In the farming areas pasture growth started a bit late and was somewhat retarded by cold nights during the winter, but since then has made such prolific growth that in most cases there are insufficient animals to keep it under. This flush of feed has assured the full development of lambs, and so the quality of the lambs slaughtered for export has been highly satisfactory, and will help towards maintaining the good name we have been developing for our fat lambs on the markets of the United Kingdom. The growth of the fat lamb industry is most pleasing, and of the utmost value to the State, and has made extremely rapid progress in recent years. Five years ago we exported something less than 54,000 lamb carcasses, whereas during the year which closed on 30th June, 1937, we sent overseas 420,000 carcasses of lamb.

Although we have not yet reached the figures attained for the export of fat lambs, the shipping overseas of carcasses of pork had made even greater progress over the last five years. In 1932 we sent to Europe a few more than 200 frozen carcasses of pork, whereas last year the number exported exceeded 16,000, which is a very great increase to take place within five years. There is a very big market in the United Kingdom for pig products, much of which is supplied by foreigners, and there appears to be no reason why we cannot displace some of these suppliers by producing pork of a quality at least equal to theirs, and at a lower cost. Barley produces pork and bacon of the highest quality, and we grow this cereal very cheaply, and as pork can be shipped with perfect safety in the frozen state the pig industry offers great possibilities for South Australia.

In the dairying industry our greatest progress has been made in the production and improvement in quality of cheese. During the past five years the production of cheese has been doubled, but more important than this is the fact that our exports of cheese have risen from one and a half millions of pounds to seven and a third millions of pounds per year in the same period. The quality of the cheese manufactured nowadays is so superior to what it was a few years ago that no comparison is possible, and on present appearances it seems that South Australia is likely to become the cheese-producing part of the Commonwealth.

Despite the increase in the price of grain, the production of eggs for export has shown only a relatively slight reduction of recent years, and the poultry industry remains one of the important rural industries of the State. There has been a decline in the exports of eggs in shell, and an increase in the export of egg pulp, but the difference in price received for eggs in shell as against that for eggs for pulping is so great that it behoves all poultry keepers to aim at producing eggs suitable for export in the shell.

In connection with the shipping of animal products overseas, I would remind you of the interest taken by the Government in the matter, evidenced by the modernisation of the Slaughtering Works at the Metropolitan Abattoirs to permit of the slaughter and treatment of carcasses for export under the most up-to-date methods known, and in the extensions to the Port Lincoln Freezing Works, so that the slaughtering capacity has been more than doubled.

To make certain that a fuller knowledge of the life history and methods of control of grasshoppers is obtained before we have another serious visitation from these pests, the Government has made money available for the past three years for investigations into breeding grounds and habits of the insects. Much work has already been done in this connection and the Government is determined that the investigations shall be continued until some finality is reached.

Rabbits do so much damage to pastures and crops in this State that the Government readily acceded to the request of the Council for Scientific and Industrial Research to provide an area on an island on which to test the virus disease, *Myxomatosis*, and permission was given to double-fence about 100 acres of Wardang Island for field tests with the virus.

AUSTRALIAN AGRICULTURAL COUNCIL.

The most important agricultural conference which is held periodically in Australia is the Agricultural Council which met this year at Brisbane during early August, and came to some decisions which must be of benefit to the agriculture of the Commonwealth. The matters which particularly affect South Australia are:—(1) The decision that the States should pass uniform legislation to control slaughtering works where meat for export is prepared; (2) the request that the Federal Government provides funds to encourage improvement in the quality of pigs for export; (3) the resolution that owners of small flocks should have representation on the Australian Wool Board; (4) that the Commonwealth Government again contribute a grant for research work in the apple and pear industry; (5) that a man of practical ability be sent to California to study the citrus industry; (6) the request that the Council for Scientific and Industrial Research studies the question of the cleaning of eggs, and in the meantime existing practices be allowed; (7) that an inquiry be made into artesian and inland water supplies; (8) that the bounty on fertilisers be continued.

CONCLUSION.

In conclusion I would remind you not to forget the lessons of the very recent past when the outstanding features of the depression—that extremely difficult period of poor seasons and low prices—were the financial disasters which followed the purchasing of high-priced farms during the boom period immediately preceding the depression, and the recovery made by farmers by the introduction of sidelines and increasing the diversification of their farming. Diversified farming is the keynote to profits from the land throughout the ups and downs of varying seasons and financial changes, the one way to increase soil fertility, and the sure promoter of agricultural stability.

I recommend all sessions of this important Agricultural Congress to your close attention, for I am certain that you will obtain much good from all matters being discussed, and I have very great pleasure in declaring it open for business.

Chairman's Report.

[Read by Mr. S. SHEPHERD, Vice-Chairman of the Advisory Board of Agriculture.]

In the absence of the Chairman of the Advisory Board of Agriculture, Sir Wallace Sandford, it is my privilege and pleasure to preside over the 48th Congress of the Agricultural Bureau.

The first Congress of this kind was held in 1890 and, quoting the official report, the object of that Congress was "to cement the bond of union between the members of the various branches and the Central Bureau." I do not know of any better reason for holding a congress of an organisation like ours and we should approach to-night's function in the same light as did the early pioneers of the movement. At the time of the first Congress there were 37 branches, and only a small building would have been necessary to accommodate two delegates from each branch. By comparison with the vast audience we have here to-night, some estimate may be formed of the wonderful strides which the Bureau has made both in regard to membership and popularity. We have an Institution which has commanded the respect of the general community over a period of 49 years. Its usefulness is apparent to anyone associated with agriculture, and to many others besides.

On behalf of the Board, I congratulate the Branches on their magnificent response to this Congress by sending such a large number of delegates, and I desire to extend a sincere welcome to you and our best wishes for a successful and instructive series of meetings.

The numerical strength of the Bureau may be shown by the following figures:—There are 342 branches with a membership of over 6,000. Owing to various causes, the following 16 Branches have been closed:—Clanfield, Tarpeena, Tintinara, Langhorne's Creek, Glossop, Penneshaw, Boolgun, Goode (Women's Branch), Mount Schanck, Richman's Creek, Belalie North, Glencoe West, Stirling, Rhynie, Amyton, and Salisbury. On the other hand, new Branches have been formed in 12 districts, viz.—Glencoe, Kingston, Summerfield, Keyneton, Robe, Murraminga, and Blewitt Springs; with the following Women's Branches:—Alawoona, Murraminga, Willowie, Milang, and Smithville. Notwithstanding the small decrease of 4 Branches as compared with last year, the total roll has increased by over 500 members.

It is with very much regret that we have recently learned of the retirement of Mr. George Jeffrey. Mr. Jeffrey, who is a past Chairman of the Board and a Life Member of the Bureau, feels that on account of failing health, he is no longer able to carry on as a member. He has been associated with the Bureau for many years as a representative of the Wool Industry, and his business experience as well as his sound practical advice and judgment have been highly valued. By freely imparting his intimate knowledge of the wool trade, he gave to members of the Board a sense of security in their decisions when matters relating to that Industry came up for discussion. While we greatly deplore the circumstances which have led to his resignation, we extend to him our best wishes for many happy years to come, and trust that he will continue to take an interest in our doings.

The Minister has been pleased to appoint Mr. C. A. Loxton, Chief Inspector of Stock, to a seat on the Board, and we look forward to Mr. Loxton's technical and practical advice when various stock matters are dealt with.

The Board has held 10 meetings during the year, and has given attention to numerous items submitted to it by Congress, District Conferences and Branches. No fewer than 140 resolutions were placed on the Board's Agenda papers. These resolutions covered a wide range of subjects, and it is our aim to give careful consideration to each one of them, and to deal with them all according to their merits. Some resolutions had a purely local complexion, and consequently were best dealt with by Parliamentary representatives. Wherever this was so, branches were advised to take such matters up with the members for their district.

Many of the items were, however, of general importance, and the Board has not hesitated to exercise its influence with various authorities in an endeavour to give effect to them, and especially has this been the case where the adoption of certain resolutions was calculated to improve the conditions of farmers as a whole.

ADDITIONAL INSTRUCTORS.

Conferences and Branches have made repeated requests for the appointment of a qualified Veterinary Officer, whose duty would be to visit districts in the State, to give lectures on Veterinary Hygiene to Branches of the Bureau, and to be of help to officers of Veterinary Lodges. This has received our strong support. We have had assistance from the Stock and Brands Department from time to time, but owing to their other duties, officers of that Department could not be expected to give the attention which Branches would desire. A committee waited on the Minister to ask that a special officer be appointed for the purpose, and although no promise of immediate approval was given, it is hoped that the Government will favourably entertain what we feel is an urgent need at present.

The Government has also been approached to appoint a Sheep Instructor and a Pig Instructor, as recommended on various occasions by Branches.

One item which has been of special interest to farmer's on Eyre's Peninsula was the extension of the Port Lincoln Freezing Works. Conferences and Branches asked for greater provision for the treatment of fat lambs and pigs at Port Lincoln. The raising of fat lambs in Eyre's Peninsula districts developed far beyond the capacity of the former Freezing Works, and the Government is to be commended on granting greater facilities to cope with these industries. Now that the Government has done its part—and has done it well—the Board trusts that the Government may with confidence rely upon the support of Bureau members to keep up a regular supply of lambs to maintain the works at full capacity.

For some years the Bureau has endeavoured to obtain legislation providing for the compulsory de-horning of bulls. In the absence of such legislation, and following last year's Congress, the Department of Agriculture has instituted a scheme designed to encourage dairymen to have the work done in a voluntary way. Dairy Advisers have been supplied with the necessary apparatus for demonstrating the operation, and a number of farmers have already placed their herds within reach of this service. Originally the request referred only to bulls with the object of securing greater safety to human beings, but the idea has extended to the removal of horns of dairy cows as well, and departmental officers have already dehorned over 1,000 head of cattle. As an indication that the Department is sincere in advocating this phase of dairying practice, the whole of the Kybybolite herd of Ayrshires has been dehorned. The advantages of dehorning are—The cows put on better condition, and greater production may be expected; injuries caused by the horns to the udders, flanks, and hindquarters are eliminated; the cows become less excited and less nervous in the yards; there is greater contentment and absence of rough treatment of younger members of the herd by older and more pugnacious cows. Furthermore, there does not appear to be an insurmountable objection to the practice in regard to show stock, as there have been examples of dehorned cattle of some breeds obtaining the highest awards in the show ring.

The Act, which was so long sought after, providing for a compensation fund for pigs, has been passed by Parliament, and is now in operation. Similar legislation for dairy cattle has also had the consideration of the Minister, who informed us, however, that he was not prepared to introduce such a measure until the beef producers and the dairymen were agreed upon some scheme for compensation. The dairymen had discussed the matter with him, but the difficulty had been to arrive at a scheme in which both the owners of dairy cattle and of beef cattle would be prepared to participate. No satisfactory scheme had been agreed upon by both sections.

SEEDWHEAT AND CORNSACKS.

Following the Chairman's statement at last year's Congress endorsing the request of Eyre's Peninsula Branches that the Government should re-open the farm at Minnipa as a seed wheat station, arrangements have been made with the sharefarmer on this farm to grow and supply seed wheat for farmers in the Eyre's Peninsula districts at prices equivalent to those charged at Turretfield.

In reply to the Congress resolution asking the Government to assist farmers in obtaining supplies of suitable seeds true to type to improve pastures, the Director of Agriculture stated that without a Pure Seeds Act the Department was practically helpless. The Board then decided to draw the attention of the Government to the necessity of appropriate legislation. The introduction of the Pure Seeds Bill is now under consideration. The Minister has just informed you of the scheme which the Department has inaugurated in connection with certification of pastures grown for seed.

The quality of cornsacks was again discussed at a Bureau Conference this year, and the Department of Commerce has been approached with a view to seeking an improvement in quality and to ensure that sacks sold on the market are up to the standard required by Federal regulations.

Members of branches in fruit-growing districts will recall that at last year's Congress, a resolution was carried asking the Government to take steps to send a representative to California to study the citrus industry there. You will note from the Minister's speech that this has recently been brought before the Australian Agricultural Council which passed a resolution on similar lines to go before the Federal Government, and recommending that the cost be borne on an equitable basis by the Commonwealth Government, the citrus-producing States and the Industry itself.

Steps were taken to bring under the notice of appropriate authorities the Congress request that the application of the apple bounty be made on the former system of payment according to disabilities caused by climatic conditions such as frost, hail, storms, &c.

Support was given to the question of stimulating the home consumption of fruit as well as the Congress request that bags containing seed potatoes to be branded with the name of the grower.

Insurance of crops came up for discussion at the Waikerie Conference as the result of a paper by Mr. F. B. Harden. It is not a new subject, but it has not found favour with Insurance Companies except in regard to hail. Mr. Harden's paper went further and proposed an insurance which would cover the grower on the River against frost up to the extent of the cost of putting in the crop. A Committee has been appointed to make further investigations and to ascertain the extent to which insurance companies would be prepared to contract against frost or other climatic disabilities. It has been stated recently that a company in Victoria insured a property owner against a limited rainfall within a given period, and it was said to be the first policy of its kind in Australia. This may break new ground for insurance risks, not only against drought, but against many other ills which confront the primary producer.

A good deal has been written and said about the agricultural possibilities of Kangaroo Island, and in order to make a practical investigation into this matter, the Director of Agriculture has approved of a suggestion from the MacGillivray branch that systematic experiments be conducted there.

The Board is called upon at times to consider resolutions contrary to one another. For example, a conference sought the complete protection of opossums, and a branch asked for an open season for these animals during the winter months. In view of the valuable assistance which the opossum renders in checking the growth of mistletoe, and thus doing its part in saving the Blue Gum from destruction, a recommendation for an open season could not very well be made. It might be pointed out, however, that orchardists or others may make individual applications for permission to destroy on their own property opossums causing damage to fruit trees, etc.

Again, the same Conference asked for complete protection of kangaroos in areas extending from Adelaide to the South Coast: this was approved. About the same time a branch on the western side of Eyre's Peninsula made a very unusual request that kangaroos be regarded as vermin. The question of proclaiming an open season for 12 months in that area is at present under consideration.

EDUCATION.

In regard to the teaching of first-aid in outback schools, the Director of Education stated that the sub-committee appointed to advise on the revision of the Primary School syllabus had recommended that health education be included in the new syllabus as a subject to be taught from Grade I. to Grade VII. Simple lessons on first-aid were included in this course.

The present staff of the Education Department was not, however, sufficient to provide frequent visits by school dentists to any area, and as far as possible regular visits were made to each in turn.

Special reference was made at last year's Congress to the work of the Urrbrae Agricultural High School. The Board paid a visit to this institution and decided to bring the advantages of the school under the notice of conferences from time to time with the object of inducing parents to enrol their boys or to promise to do so if residential facilities were provided. As a purely day school, there was accommodation for 100 pupils, and it was the intention of the Education Department to ask the Minister to complete the school so as to make it a residential establishment as soon as the enrolment reached that mark.

Branch members welcome no doubt the resumption of a regular series of wireless talks on agricultural topics, which are broadcast through the Australian Broadcasting Commission by officers of the Department of Agriculture. Likewise, members of Women's branches have listened with interest to the talks by Miss Campbell of the Education Department on branch activities. The Bureau feels very much indebted to Miss Campbell who has done so much work of a voluntary nature for the advancement of the Bureau system, and who has, whenever circumstances have permitted, addressed many branches and conferences throughout the year.

CROP COMPETITIONS.

With the improvement in the wheat position, renewed interest is being shown in Wheat Crop Competitions. Increased encouragement has recently been given by the Government in providing financial assistance at the rate of shilling for shilling up to 10s. per entry. Thus it is expected that the Government subsidy will be more than double the grant of £100 which it had given during recent years.

It would be appropriate at this juncture to refer to the prizes donated by the Millers' Produce Company Limited. In order to encourage the growing of wheat of high milling quality, this Company has, over the past two seasons, assisted District Committees by donating a cash prize to each District of £5 5s. for the crop which secures the highest points and which does not contain the varieties Gallipoli, Free Gallipoli, Ghurka, Nabawa, and Waratah. I understand that the Company has again offered the same prizes for this year.

If I may be pardoned in mentioning any special efforts of branches during the year, I would choose those of competitors in the Bureau Exhibits at the 1936 Royal Show. The preparation and staging of the Balhannah exhibit was a striking example of efficient organisation, and the branch set an exhibition standard which was an object lesson to any institution. Excellent entries were also made by Strathalbyn and Mount Barker, and the section which displayed these three entries was as much inspected and admired as any other portion of the Show. Our congratulations are extended also to Strathalbyn on their further effort this year, which I trust you will all take an opportunity to inspect.

WOMEN'S BUREAUX.

The Women's Branches have maintained their high standard of work, and many splendid attendances at meetings have been reported. Many of them have been successful in introducing new ideas for their meetings, which all goes to show that there is no lack of interest in Bureau work. Women's Branches have been a great help at District Conferences, and at their own sessions some valuable papers have been discussed. Exhibitions of women's work are perhaps the most popular phase in the activities of Women's Branches. The staging of exhibits has for years been a feature of Men's meetings in certain districts, and this adjunct to the instructional work of the Bureau goes back to the early days of the organisation. The Women's Branches are therefore to be commended for the part they are taking in this matter. They have advanced a stage higher than merely exhibiting handicrafts at individual meetings. A competitive exhibition of work has now become a regular part of the year's programme in several districts, and these exhibitions have been something big to talk about and are of high educational value.

The Women's Section is gradually increasing in numerical strength and has been a pronounced success. Many inquiries about forming new Branches have been received throughout the year, and the time has arrived when every Men's Branch in the State should see that corresponding Women's Branches are formed in their respective districts.

One of my most pleasing duties in connection with this Congress is to acknowledge on behalf of the Board and on your behalf, too, the spontaneous assistance which is given to us by officers of the Department of Agriculture and by others. The extension service of the Department is appreciated by all members, and we would like to see it increased. We recognise that the Director of Agriculture (Mr. W. J. Spafford) is intensely interested in the Bureau, and that he realises how useful it is to his officers in their work. Mr. Spafford attends as many meetings as he possibly can, and we do not need any further proof than this of his sincerity either in regard to his desire to be of service to the agricultural community, or to his unbounded faith in the Bureau as a means of getting in touch with the practical farmer. And what may be said of Mr. Spafford in this respect may be also said of his officers. As representatives of the Board and of Branches, we would like the Director to know, therefore, that we sincerely appreciate what he and his officers are doing for us. Further, and in similar strain, do we express our thanks to other organisations such as the Roseworthy Agricultural College, the Stock and Brands Department, the Waite Research Institute and the School of Mines for the assistance they have given to us during the past year.

Our thanks are also due to the large number of Branch Secretaries who are doing a lot of work on our behalf. The Secretary has many duties to perform, and the smooth running of the unit for which he is responsible depends very largely on his organising abilities, tact and devotion to his Branch. We must not be unmindful, therefore, of the fact that whatever success we may claim, it has been wrought, in no small degree, by these men and women— who are good enough to occupy the main executive offices in their Branches.

THE BUREAU'S JUBILEE.

The Bureau is now in its 50th year, and we will soon be called upon to decide the manner in which its Jubilee should be celebrated. Ever since its establishment in April, 1888, this organisation has created untold advantages upon primary producers; it has exercised an enormous influence on our agricultural practices; it has brought producers together, and it has raised their calling to higher levels; it has kept the practice of farming running parallel with scientific standards by maintaining a close union with the technical and the scientific worker, and it has helped the State by improving the quantity and quality of her produce. Something worthy should mark the end of its 50 years service —something perhaps of a lasting nature— and I will conclude by asking delegates to this Congress to discuss this with their Branches for the purpose of suggesting to the Board how this event could be commemorated to the best advantage.

Free Parliament.

MOTIONS CARRIED.

"That the Taxation Department be asked to allow depreciation on sheds and fences in connection with Income Tax Assessments."

"That we ask for a zoning system of motor registration to be introduced in this State."

"That Congress be asked to approach the postal authorities with a view to reducing the rates on country telephone lines."

"That the telephone calls on all trunk lines be extended from three minutes to five minutes at the same minimum rates."

"That the rail freight on fencing posts be reduced to the level of freight on dunnage or firewood."

"That the Railways Department be requested to provide suitable cover for perishable goods at country railway sidings."

"That legislative provision be made for the inclusion of a clause on all wheat storage notes or warrants issued to farmers setting out that all wheat delivered to and stored with wheat merchants, millers or other wheatbuyers remain the property of the grower until sold."

"That Congress urge the Federal Government to continue the bounty on artificial fertilizers, irrespective of the kind of crops for which they are used.

"That the Federal Bounty on fertilizers be extended to include lime and high percentage gypsum."

"That whilst the experimental work at present carried on in the Kingston district is greatly appreciated, the Government be asked to provide for the work being carried on on a much larger scale in future."

"That the Government appoint a veterinary surgeon to be stationed in Adelaide and that his services be available for research work and for lecturing to branches of the Bureau."

"That Rule No. 9 of the Veterinary Surgeons Board be disallowed."

"That the Government appoint a Sheep Instructor to be stationed at and work in conjunction with the Roseworthy Agricultural College."

"That a Sheep Instructor be appointed to the staff of the Department of Agriculture."

"That the Government appoint a Viticultural Instructor."

"That an instructor be appointed for the vegetable growing industry."

That the Government be requested to make an advance available to farmers to enable them to purchase pedigreed live stock, such advance to be recoverable by the Government at a reasonable rate of interest over a period of years."

"That the Government be asked to make passable roads leading into country surveyed for closer settlement before this country is thrown open for application."

"That Congress considers that the present method of bull registration has not fulfilled its purpose, viz., the elimination of the scrub sire. It therefore urges that the Act be amended to the effect that all scrub bulls 12 months old or over be subject to a registration fee of 10s. and that pedigreed animals be exempt from any form of taxation."

"That we protest against the extra exchange on Evre's Peninsula cheques."

"That the Department of Agriculture devise a more drastic method of destroying Fumitory. This weed is becoming a serious menace in some cases smothering a would be 10 bag crop of wheat to one bag per acre. The weed is rapidly spreading over the Murray Flats."

"That a period be declared for the poisoning of foxes and that the Government be approached *re* small bonus on all scalps."

MOTIONS LOST.

"That the authorities be asked to remove the registration fee for dairy cows."

"That this Congress recommends to the Advisory Board that the Adelaide Congress be held in the latter part of the week prior to the Royal Show."

MOTION WITHDRAWN.

"That we ask that the system of allowing buyers draft allowance on wool be discontinued."

Delegates to the Annual Congress visited the Waite Research Institute on Thursday, 16th September. The party listening to a short address by the Director (Professor A. E. V. Richardson).

Important Weeds of South Australia

[By G. H. Clarke, B.Sc., Botanist, Waite Agricultural Research Institute,
University of Adelaide.]

No. 22.—FALSE CAPER (*Euphorbia terracina*, L.).

Preliminary Remarks.

The False Caper is a green perennial herb growing to a height of from 1ft. to 2ft. It consists of a number of erect or ascending slender leafy stems which arise from a greatly shortened rhizome or stump at about the ground level. These aerial stems are often tinged with red, especially in later stages of their growth, and they bear narrow and alternately arranged leaves, 1in. to 2in. in length. In its native home the species grows wild on the coastal sand dunes bordering the Mediterranean, and it appears to have established itself in corresponding situations near Adelaide many years ago. It is especially common in

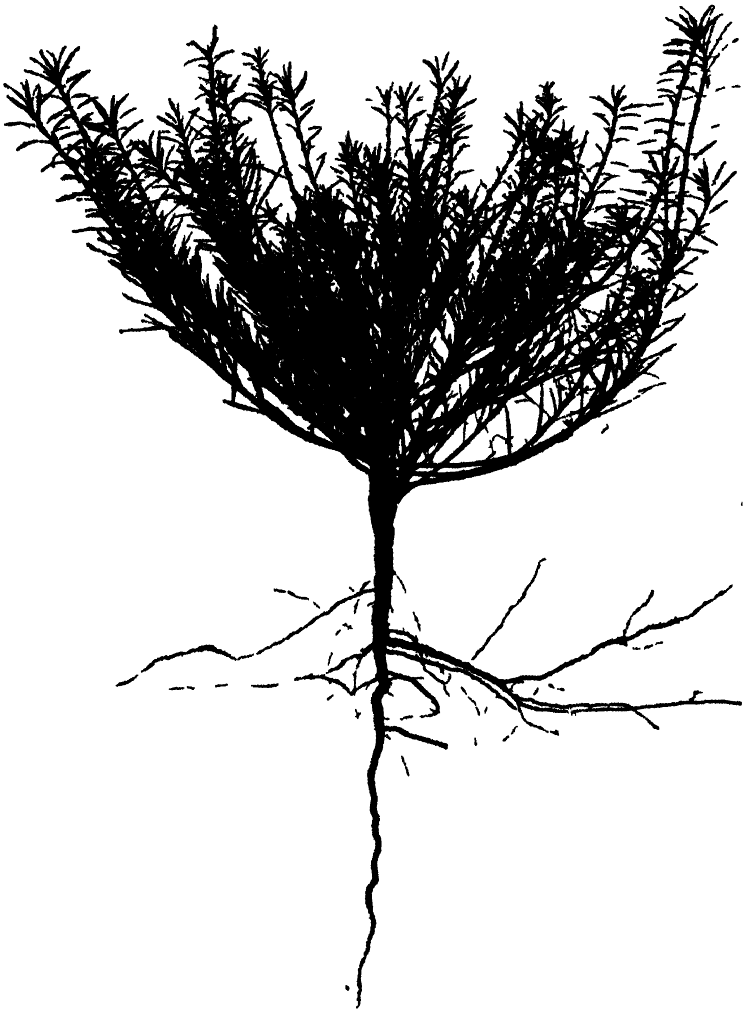
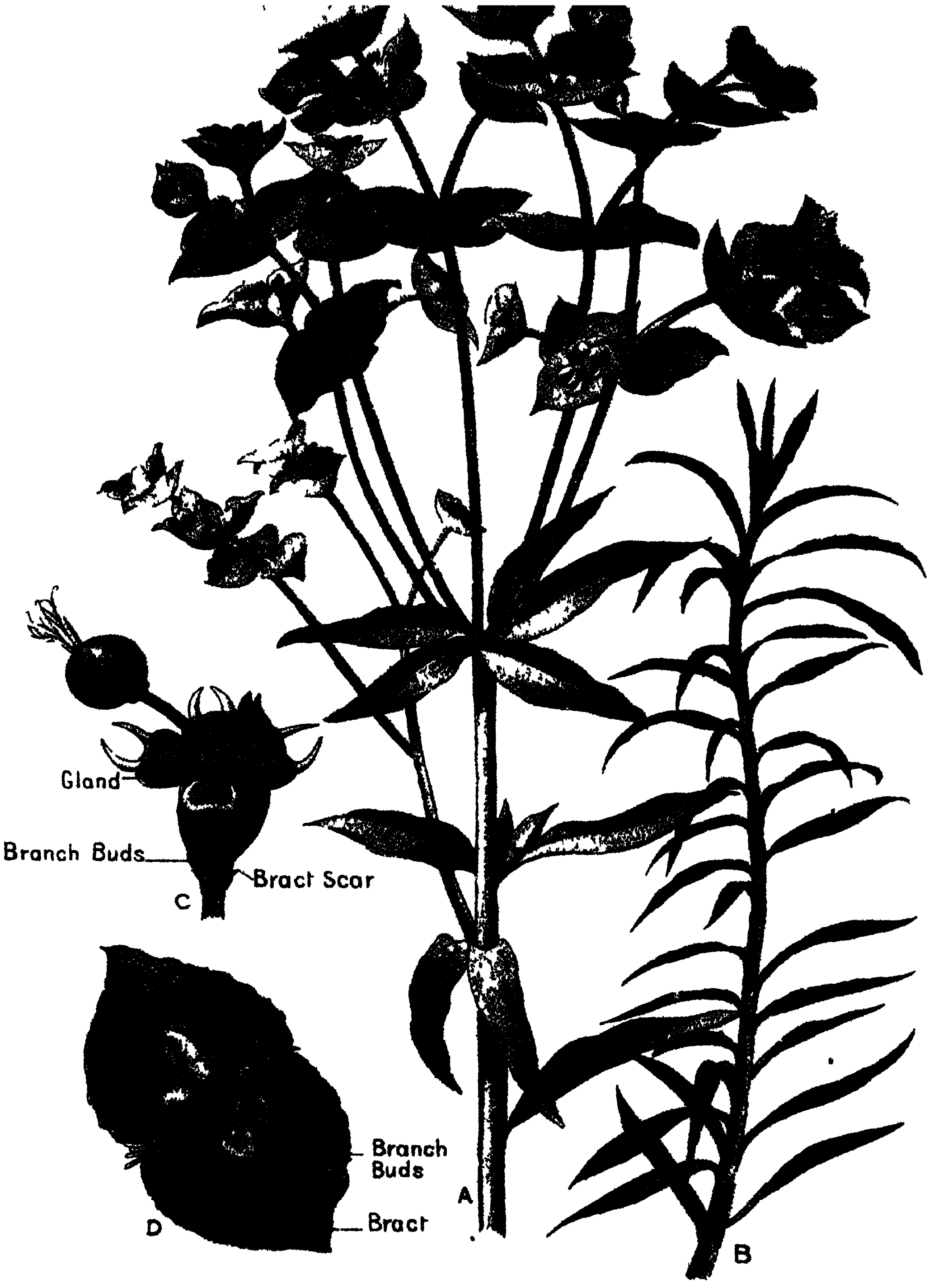


Fig. 1.—*Euphorbia terracina.* **Young plant, photographed in the winter, showing vegetative branches.**



FALSE CAPER (*Euphorbia terracina, L.*)
A.—Flowering branch. B.—Vegetative branch (both about natural size).
C.—Cyathium viewed from the side (bracts removed). D.—Cyathium viewed from above. (C. and D. enlarged.)

such places as Brighton and Glenelg, and between Semaphore and Outer Harbour; but it occurs also to some extent inland, and, in fact, occupies a good deal of sandy country towards the River Murray, to the east and south-east of Adelaide.

As early as 1903 the False Caper was declared to be a noxious weed in South Australia; but, owing to an error, the botanical name was at first wrongly gazetted as *Euphorbia lathyris*, L., which name belongs, however, to the Caper Spurge, which is a distinct, though similar, species. The Caper Spurge, a native of Europe and Asia, is stated to occur, somewhat rarely as a weed in South Australia. It is distinguishable from the False Caper by its opposite and four-ranked leaves.

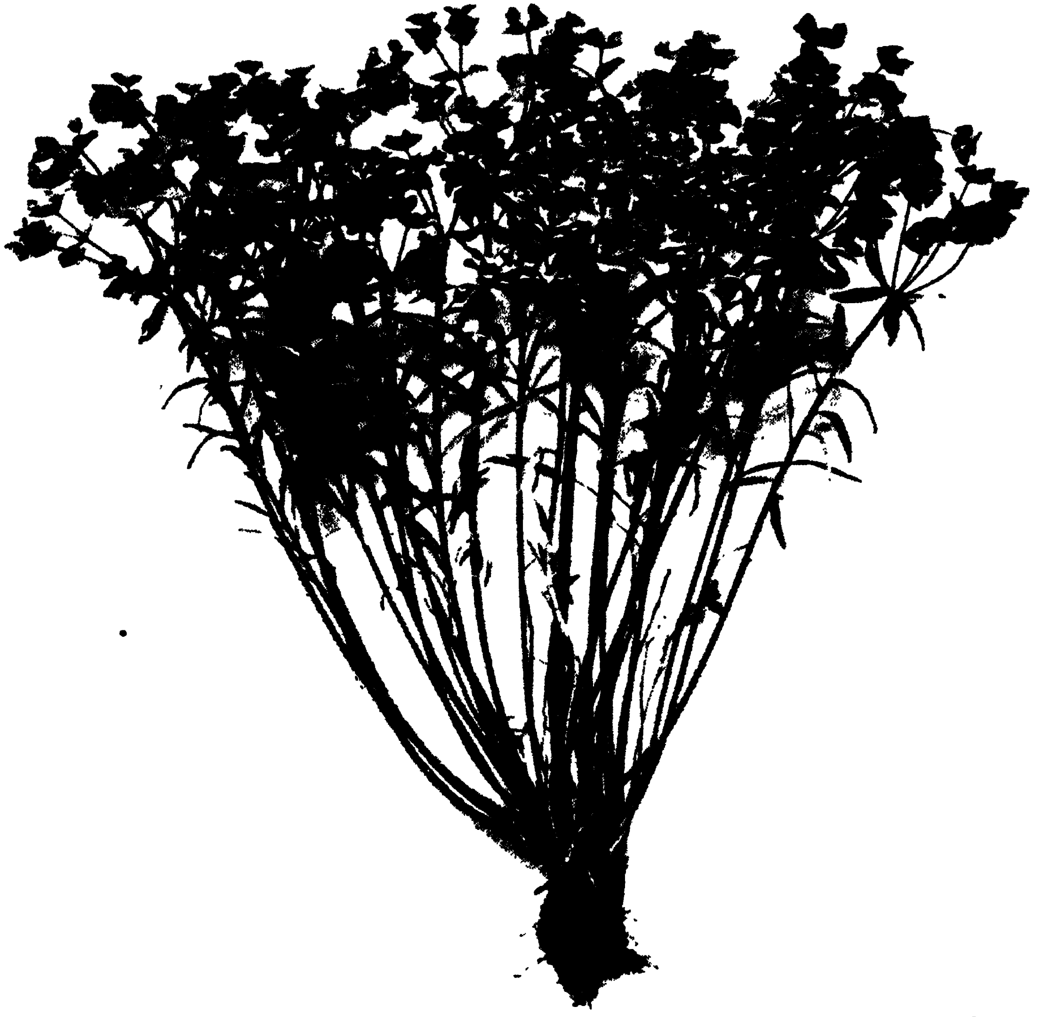


Fig. 2.—*Euphorbia terracina*. Young plant, photographed in spring, showing the general habit (see coloured plate opposite). Note the terminal position of the inflorescences; these are a development of the current year's growth.

Botanical Characters and Classification.

A number of species of *Euphorbia*, both native and introduced, occur as weeds in this State. One of these, namely Milkweed (*E. Drummondii*, Boiss.), a native species, has been described in the present series (No. 16, this *Journal*, Vol. 39, No. 1, p. 95, August, 1935). An account has already been given, therefore, of the main characters which distinguish the *Euphorbias* from other families of plants. In particular, the nature of the *cyathium* or inflorescence unit, a structure which superficially resembles a single flower, but actually consists of a number of male florets surrounding a central female floret, the whole structure being contained within a protective involucre of bracts, has been explained, and need not be repeated here. It will be sufficient to say that the *cyathium* of *Euphorbia terracina* has a structure essentially similar to that of *E. Drummondii,* but that it differs in size, and also in the shape and colour of the involucral glands. The glands in this case are crescent-shaped and of a greenish colour, and each is provided with a pair of slender horns or processes (see Coloured Plate, Figs. C and D). *Euphorbia terracina* is, of course, a much larger plant than *E. Drummondii,* from which it differs also in its erect habit and in having the cyathia in umbel-like major inflorescences instead of bearing them singly on the ordinary vegetative branches.

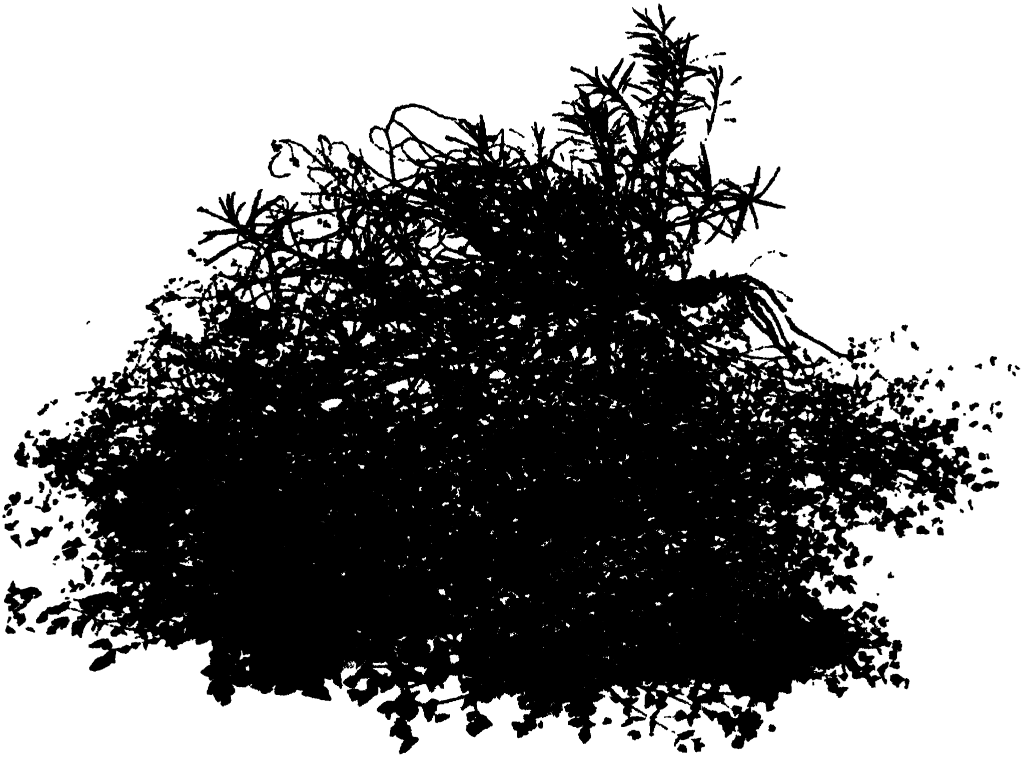


Fig. 3.—*Euphorbia terracina.* Old plant, photographed in winter, showing masses of flowering branches formed by the continued growth of the inflorescences of the previous year. Note the vegetative shoots arising from the thick main stem. During the spring these would develop terminal inflorescences similar to those shown in Fig. 2.

From the other introduced species of the genus *Euphorbia terracina* is distinguishable by its alternate stem leaves without stipules, by its perennial habit, by its smooth fruits, and by the minutely-toothed leafy bracts clothing the inflorescence branches.

In the *Flora of South Australia* Mr. J. M. Black describes *E. terracina* as follows:—

> Glabrous erect or ascending perennial; leaves sessile, linear-lanceolate, 1½-3 cm. long, denticulate towards the summit; umbel of 4-5 rays, repeatedly forked; bracts ovate rhomboidal, mucronate, denticulate; glands greenish, lunate, with very long slender horns; capsule 4 mm. long, smooth; seeds caruneulate, grey, smooth.

Habits of Growth.

Plants of False Caper present somewhat different appearances at different stages and seasons of growth owing to the repeated forking and continued growth of the inflorescence branches. These branches bear opposite paired leafy bracts differing in size, shape, and, to some extent also in colour, from the stem leaves or leaves proper. Each of the several erect or ascending stems in its lower part bears alternately arranged, linear-lanceolate, leaves; towards the summit it produces a circlet or whorl of bracts which are intermediate, as regards size and shape, between the stem leaves and the paired bracts of the flowering branches. This whorl of bracts subtends a corresponding number—usually about 4 or 5—of primary inflorescence branches or umbel rays into which the stem breaks up. These rays branch repeatedly in a dichotomous or forking manner, and give rise to numerous slender flowering branches which hang downwards, a pair of bracts and a cyathium being formed at each point of bifurcation.

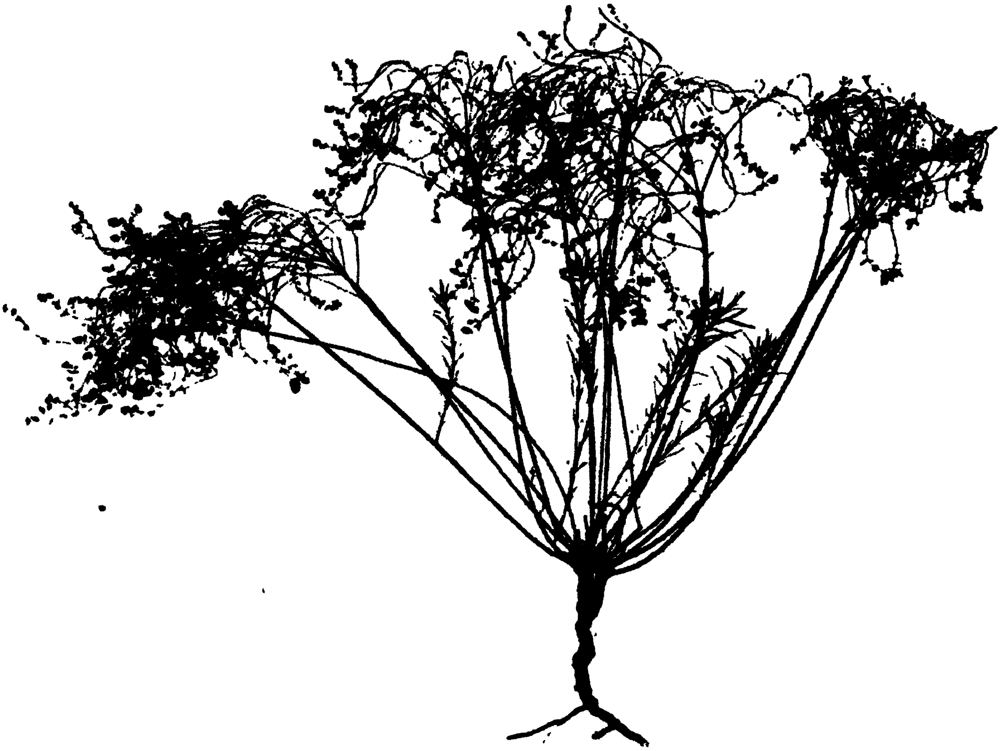


Fig. 4.—Old plant, showing flowering branches of the previous year and a few new vegetative shoots arising from the stem.

The flowering period is usually stated to be during the late winter and spring months, but it is often prolonged considerably as a consequence of the continued growth of the flowering branches borne on the stems of the previous year; it may last almost until the time of development of inflorescences on shoots of the current year. Owing to this circumstance, a variety of appearances is to be observed, especially during winter, in localities where the plants are growing in abundance and have been established for a number of years. Growth commences in autumn, and, during the winter, the younger plants show the type of growth illustrated by Fig. 1, and consisting of vegetative shoots only. Certain of the older plants at this time will show a similar vegetative growth arising from the main stump slightly above the bases of the flowering shoots of the previous year, as in Fig. 4. In many of the older plants, however, these old flowering shoots will be seen to be connected with masses of pendulous branches bearing bracts and cyathia, in some cases reaching the ground and forming a dense leafy growth surrounding the bases of the new vegetative shoots; this condition is illustrated, though somewhat unsatisfactorily, by Fig. 3.

As the winter advances growth of the flowering branches declines, and eventually ceases as the new inflorescences begin to develop at the ends of the vegetative shoots representing the current year's growth. Fig. 2 illustrates the typical appearance of plants during spring and summer, when each stem is terminated by a newly-developed inflorescence.

Properties.

Like other *Euphorbias* the False Caper contains a milky sap which readily exudes from the cut surfaces of the stems, leaves, and other parts. In some species this sap is poisonous, while in others it is irritant and, in certain cases, caustic. While definite evidence is wanting in the case of *E. terracina,* the plants are doubtless more or less poisonous, and are certainly not eaten by stock to any appreciable extent.

Eradication.

The False Caper grows chiefly on uncultivated sandy soils, and it can be got rid of by repeated cultivation. Unfortunately, however, it occurs mainly in poor situations where such measures are not economically practicable. The use of chemical weedicides is, of course, subject to the same limitations. While economic considerations may render its eradication difficult from those areas on which it has become firmly established, it should be possible to confine the weed to these situations, and to prevent its spread to new localities, without undue expense. The most satisfactory method of dealing with it is by cultivation or, in the case of small infestations, by hand pulling. Owing to the sandy nature of the soil in which the plants are most often found growing, the grubbing out of entire plants is not usually a very difficult task.

Agricultural Bureau of South Australia

Murray Lands East Branches Conference

Murray Lands East Branches of the Agricultural Bureau met in Conference at Taplan on 28th September, and it was disappointing for local Bureau members, who had spared no effort to make the day a success, that the attendance was so small.

Mr. W. J. Hammond presided and Mr. A. J. A. Koch, on behalf of the Advisory Board, declared the Conference open. Mr. P. R. Hodge (Taplan) read a paper, "Mallee Farming Past and Present." Departmental Officers replied to questions referring to lamb breeding, fertilizers for sandy soils, ensilage manufacture, &c.

During the afternoon Mr. C. H. Goddard, Assistant Wool Instructor at the School of Mines gave a demonstration in Mr. Hart's shearing shed.

At the evening session Mr. W. J. Spafford (Director of Agriculture) gave an address, illustrated with lantern slides, "Some Peoples of the South."

Herd Testing Results

The Supplement in this Issue contains a record of:—

1. **Production figures, under Official test, of pure bred cows which completed their tests during the quarter ended 30th June, 1937.**
2. **The "Gold Medal" Competition inaugurated by the South Australian United Stud Dairy Cattle Breeders Association.**
3. **Herd Testing Associations (not official) production figures for months April to June, 1937.**
4. **Annual production figures (not official) of the Hills Herd Testing Association, 1936-37.**

Below, Mr. H. B. Barlow (Chief Dairy Instructor) reviews the results of the various classes in the Official Tests.

Junior 2 Year Old (Standard 230lbs. Fat).—In this class 76 animals (49 Jerseys, 2 Guernseys, 10 A.I.S., 15 Ayrshires) were submitted to test; 64 cows (40 Jerseys, 2 Guernseys, 9 A.I.S., and 13 Ayrshires) completed 273 days' test and 38 Jerseys, 5 A.I.S., and 9 Ayrshires obtained certificates; 9 cows, all Jerseys, produced in excess of 350lbs. fat, headed by "Tuela Dracena" (F. Coleman) with 388.92lbs. fat.

Senior 2 Year Old (Standard 250lbs. Fat).—Twenty-nine cows (21 Jerseys, 3 A.I.S., 4 Ayrshires, 1 Guernsey) completed 273 days, and 19 Jerseys. 2 A.I.S., 2 Ayrshires reached the required standard; 9 cows, all Jerseys, produced over 350lbs. fat, headed by "Tuela Danthonia" (F. Coleman) with 562.46lbs. fat.

Junior 3 Year Old (Standard 270lbs. Fat).—Thirty-one cows (17 Jerseys, 5 A.I.S., 9 Ayrshires) were submitted to test; 19 cows (14 Jerseys, 4 A.I.S., 1 Ayrshire) completed 273 days, and 20 cows (16 Jerseys, 3 A.I.S., 1 Ayrshire) obtained certificates; 7 cows (6 Jerseys, 1 A.I.S.) produced in excess of 350lbs. fat, headed by "Pulluwewal Pride" (Mrs. A. E. Bowman) with 443.01lbs. fat.

Senior 3 Year Old (Standard 290lbs. Fat).—Twenty-four cows (12 Jerseys, 2 Friesian, 8 A.I.S., 2 Guernseys) were submitted; 20 cows (9 Jerseys, 2 Friesians, 7 A.I.S., 2 Guernsey) completed 273 days, and 21 cows (11 Jerseys, 2 Friesians, 7 A.I.S., 1 Guernsey) obtained the required standard; 16 cows produced in excess of 350lbs. fat, headed by "Lanacoona Brown May" (C. E. Verco) with 681.37lbs. fat, which is a State record for this age.

Junior 4 Year Old (Standard 310lbs. Fat).—Twenty-nine cows (13 Jerseys, 6 A.I.S., 8 Ayrshires, 2 Guernseys) were entered; 21 cows (11 Jerseys, 4 A.I.S., 4 Ayrshires, 2 Guernseys) completed 273 days, 15 cows (10 Jerseys, 3 A.I.S., 2 Ayrshires) obtained certificates; 11 cows produced over 350lbs. fat, headed by "Gunawah Postmark" (E. W. Pfitzner) with 522.22lbs. fat.

Senior 4 Year Old (Standard 330lbs. Fat).—Fifteen cows (8 Jerseys, 3 Ayrshires, 2 A.I.S., 2 Guernseys) commenced test; 9 cows (6 Jerseys, 2 A.I.S., 1 Ayrshire) completed 273 days. Only 4 cows (4 Jerseys) obtained certificates, headed by "Pella Viola Doone" (C. E. Verco) with 516.43lbs. fat.

Mature Cows (Standard 350lbs. Fat).—Seventy-seven cows (49 Jerseys, 4 Friesians, 16 A.I.S., 4 Ayrshires, 4 Guernseys) commenced test; 63 cows (45

Jerseys, 11 A.I.S., 4 Friesians, 1 Ayrshire, 2 Guernseys) completed 273 days; 50 cows (36 Jerseys, 4 Friesians, 9 A.I.S., 1 Ayrshire) obtained certificates, headed by "Murray Glen Echo Topsy" (C. J. Morris) with 763.79lbs. fat.

In all, 281 cows were submitted to test; 220 completed their period of 273 days, and 185 cows passed the required standard.

Summarising the results of different breeds for the period:—

	Submitted.	Completed 273 Days.	Obtained Certificate.
Jerseys	169	142	134
A.I.S.	50	40	29
Ayrshires	43	23	15
Friesians	6	6	6
Guernseys	13	9	1

The two leading cows in each class are:—

	Lbs. Milk.	Average Test.	Lbs. Butterfat.
JUNIOR TWO.			
Mr. F. Coleman's "Tuela Dracena"	7,155	5.44	388.92
Mr. L. W. Frost's "Woodside Volunteer's Pride"	6,480	5.92	383.94
SENIOR TWO.			
Mr. F. Coleman's "Tuela Danthonia"	9,091½	6.19	562.46
Mrs. Allan E. Bowman's "Pulluwewal Duchess Flavia II."	8,460	5.52	466.80
JUNIOR THREE.			
Mrs. Allan E. Bowman's "Pulluwewal Pride"	8,115	5.46	443.21
Mr. L. W. Frost's "Cumberland Princess Rhonda"	7,627½	5.70	435.09
SENIOR THREE.			
Mrs. C. E. Verco's "Lanacoona Brown May"	11,712	5.82	681.37
Mr. W. Hawker's "Anama Alcartra Judy"	14,655	3.33	487.98
JUNIOR FOUR.			
Mr. E. W. Pfitzner's "Gunawah Postmark"	7,926½	6.59	522.22
Mrs. Allan E. Bowman's "Lallawa Chieftain's Diana II."	9,000	5.31	478.16
SENIOR FOUR.			
Mr. C. E. Verco's "Pella Viola Doone"	8,760	5.90	516.43
Mr. R. J. Laing's "Glen Ewin Misty Morn"	8,622	5.91	509.33
MATURE.			
Mr. C. J. Morris' "Murray Glen Echo Topsy"	2,117½	3.61	763.97
Mr. C. E. Verco's "Melvin Duchess"	12,459	5.18	645.46

Attention is directed to the especially meritorious performance of Mr. C. E. Verco's Jersey cow "Lanacoona Brown May" which, with her yield of 681.37lbs. butterfat, established a new record for the senior three-year-old class in South Australia. Mr. Verco is to be congratulated on being both the breeder and owner of this record-breaking cow.

For the purpose of comparison, the following are the names of the cows holding State records, irrespective of breed, in their respective classes as at 30th June, 1937:—

Junior Two-year-old—"Pulluwewal Jean" (Mrs. A. E. Bowman), Jersey, 516.66lbs. fat.

Senior Two-year-old—"Lanacoona Brown May" (C. E. Verco), Jersey, 633.73lbs. fat.

Junior Three-year-old—"Murray Glen Beets Superior" (C. J. Morris), Friesian, 594.52lbs. fat.

Senior Three-year-old—"Lanacoona Brown May" (C. E. Verco), Jersey, 681.37lbs. fat.

Junior Four-year-old—"Kiama Robin 2nd" (E. and A. Nicholls), A.I.S., 703.03lbs. fat.

Senior Four-year-old—"Murray Glen Princess Maggie" (C. J. Morris), Friesian, 701.02lbs. fat.

Mature—"Murray Glen Sylvia Topsy" (C. J. Morris), Friesian, 828.26lbs. fat.

"Murray Glen Sylvia Topsy" was carried on for 365 days and gave the wonderful production of 31,242½lbs. milk and 1,027.14lbs. fat.

Wireless Talks

Spring in the Orchard : Cultivation, Sanitation, and Pest Control

Wireless Talk given by Mr. R. Fowler, Manager, Blackwood Experimental Orchard, on 27th September, through Station 5CL.

The advent of warm weather has not only brought the fruit trees out of their winter sleep, but has also brought to life certain pests and diseases which will take heavy toll of the fruit crops if the necessary precautions are not taken to control them.

Stone fruits have flowered and set their fruit, and apples and pears are now opening their blossoms. With his usual unbounded optimism, the fruitgrower is taking stock and making a first forecast of the coming crop.

He knows that without blossoms, he cannot get fruit, but also knows that very heavy blossom does not always mean a good crop. Many factors will operate between now and harvest time to modify any estimate he may make. Some of these factors are within his own power to control and some are not, and must be just taken as they come.

No doubt also he remembers when his trees have blossomed heavily, but have failed to set even fair average crops, and experience has taught him some of the reasons why the blossoms have failed to set, though it is not always possible to determine the exact cause.

When fruit trees bloom profusely, and yet do not set a crop, lack of proper pollination is often the cause; but not always. Observations and experiments justify the tentative conclusion that unfavourable conditions of nutrition and water supply are among the basic factors which cause the normal drop of flowers and partially developed fruit.

All factors that have a direct or indirect influence on nutrition and water supply of the flower and fruit, such as pollination, weather, cultivation, fungus diseases and insect pests are of importance. With a good supply of readily available plant food and plenty of soil moisture at the right time, it is possible to get a good setting of fruit, even with relatively poor pollination facilities and unfavourable weather conditions.

The vagaries of the climate are beyond the grower's control, except that the provision of efficient wind breaks will serve to mitigate the losses caused by wind and cold and the use of the latest heating methods will protect the orchard against frost.

Lack of pollination can be overcome by interplanting other varieties to act as pollenizers or by top working one or more pollenizers in the top portion of each tree. To be a good pollenizer, the interplanted variety must bloom at the same time as the variety it is required to fertilise. The two varieties must also have an affinity for one another, *i.e.*, the pollen of one must be acceptable to the other. Furthermore, both varieties should produce abundant supplies of pollen and should be good commercial types. The pollen of fruit trees is air-borne only to a very slight extent, and one or more hives of bees per acre will be found useful in assisting pollination.

If losses have occurred in the past through the depradations of insects or disease, or the fruit has not matured to the best advantage, the decrease in the anticipated yield may have been due to a number of causes; the important thing, however, is to check up on these factors and prevent, if possible, a repetition of the losses.

The efficient grower aims at the production of a good crop of well grown clean fruit, and this type of fruit can only be grown on trees that are healthy and clean. To maintain trees in this condition, requires good orchard management and considerable technical knowledge.

Pruning is not a subject for discussion at the present time, but when this operation was in progress the grower, however, probably noted the number of fruit spurs and buds, and calculated in his mind whether the tree could reasonably be expected to bring to maturity the number of fruits that might normally be expected to develop, and pruned accordingly. If he excercised proper judgment in this respect, it may not be necessary later on to thin out the fruit crop to any extent.

Thinning.

Thinning is an important operation in the production of quality fruit, whether it be apples, plums, or peaches. It is not always advisable to permit trees to mature all the fruits they sometimes set. The practice of removing by hand a number of the fruits before maturity should become an established routine. The removal of a number of fruits from a tree will permit those remaining to develop to a larger size, and they will also acquire a better colour than would have been possible if thinning had not been done.

It is sometimes claimed that thinning will improve the chances for a crop the coming season; that is, to some extent, it will prevent alternate seasons of good and poor crops. Experience, however, so far, does not fully bear out this theory. Thining, assisted by careful annual pruning and cultivation, may be beneficial in that direction, but thinning alone cannot be depended upon to prevent alternate cropping. It will, however, materially assist in the production of better grade fruit.

With a controlled export market demanding only the very best in quality, size, and colour, it is becoming more and more necessary that only the best should be produced.

Thinning of apples should be done as soon as possible after the fruit that is going to fall has fallen in the first heavy drop. It affords an excellent opportunity for the removal of diseased and mis-shapen fruits, and permits the breaking up of clusters so loved by the codling larvae.

No definite rules can be laid down for guidance, as each variety may require different treatment. It is a matter that must be left entirely to the judgment of the individual grower.

Generally, insufficient numbers are removed to attain the best results.

Fruit trees, to produce good crops of quality fruit, should be grown in fertile, well drained, and well tilled soil; the trees should be well pruned and kept free from insect and fungus diseases, by carefully chosen, well prepared, and well timed sprays.

Fertility in regard to orchard soils is not dependent only on the application of fertilisers and the ploughing in of cover crops, or the manner in which it is ploughed and cultivated, but all these factors taken together, help to improve and keep up the level of fertility.

Cultivation.

Clean cultivation is mostly practised in the orchards of South Australia, and the best fruit is produced under this cultural system. Constant cultivation permits the admittance and retention of soil moisture by preventing evaporation and increases the supply of air in the soil, thus enabling the soil bacteria to breed quickly and extract from the air the nitrogen so necessary to plant life. Furthermore, cultivation by killing weeds, prevents them robbing the soil of moisture and plant food.

It is useless to attempt to describe a method of cultivation that can be adopted by all growers. As a rule, bearing orchards should be ploughed in early autumn to facilitate the storage of moisture in the subsoil. Much will depend on the nature of the soil, rainfall, contour of the land, and whether cover crops are grown or not. A method suitable for one district may be useless in another.

The depth of the ploughing will also depend on the character of the soil, and the depth of the root growth of trees. The deeper the ploughing, the better, provided it does not go below the top soil or injure the root system of the tree.

Sandy soil is best ploughed and worked wet to keep it as solid as possible, and heavy clay soil should be ploughed in a fairly dry condition when the furrow slice will crumble as it turns. If ploughed wet, it will often set very hard, and will be difficult to bring into a good physical condition subsequently with summer tillage.

Shallow surface tillage should be maintained throughout the season by means of harrows or cultivators, particularly after summer rains.

The question of what time to cease tillage during the summer is of some importance. The grower must take into consideration not only the maintenance of wood growth, but also the inducing of fruit bud formation. Excessive wood growth opposes the formation of fruit buds, and if excessive growth is being induced at the expense of fruitbearing, tillage should be discontinued early in the season. If, on the other hand, the trees have fully established the fruiting habit and are setting fruit abundantly, thorough tillage should be given in order to enable them to carry and mature this fruit crop.

In general, it may be said that the richer and more drought resistant the soil, the earlier may tillage cease and the poorer and drier the soil, the later may tillage be kept up.

With modern implements, it is possible to plough and cultivate practically the whole surface of the orchard except a small square immediately under the tree. This remaining portion should be fork-hoed or dug. Not only will this improve the general appearance of the orchard, it will benefit the trees and remove harbourage for insect pests, especially codling moth larvae.

Pest Control.

As previously stated, the object of all orchard work is the production of good clean fruit, and its appearance and market value will depend largely on its freedom from blemishes; particularly those caused by insects or fungus diseases. Sprays for the control of fungus diseases like Shot-hole and Curl Leaf, will have been applied, also green-tip spray for Black Spot, and now is the time to open the campaign against Codling Moth and Apple Jassid.

Within a week or two, the over-wintering larvae of the Codling Moth will have pupated in considerable numbers. Last season was a very favourable one for Codling Moth, and no doubt, large numbers of larvae over-wintered in the crevices and under loose bark about the apple, pear, and quince trees. It is advisable to complete the winter clean up as soon as possible if this has not already been done. Loose bark should be scraped from trees and props, small crevices cleaned out and filled, and split or cracked branches removed. Old bandages should be taken off and burnt. The codling larvae later on must seek shelter in which to hibernate, and the less cover that is available, the more they will be compelled to take refuge in the bands which should be provided for them.

The packing shed and old fruit cases should receive attention. If the packing shed is made moth-proof, all picking boxes that have held infested fruit can be stored in it. If the doors are kept closed, the emerging moths can be killed or trapped in molasses or vinegar solutions at the windows. Hundreds of moths can be caught in this way, and their capture is rather important for the reason that moths from the packing shed usually emerge two or three weeks later than under normal conditions in the orchard. This has a tendency to prolong the peak periods and makes proper timing of the later sprays more difficult.

Too much stress cannot be laid on the necessity for carrying out these so called supplementary measures. It is most important that the first brood moth population should be reduced to a minimum, if successful control of later broods is to be maintained.

Growers are advised to study carefully the spray schedules and other control measures recommended by the Horticultural Branch of the Department of Agriculture. These recommendations are based on the results of much experimental work, and if carefully followed, and the spraying thoroughly done, a reasonable control of codling should be attained.

Jassids or Apple Leaf Hoppers as they are more commonly called, fortunately can be treated while spraying for Codling Moth. The first brood are now hatching from eggs laid last autumn under the bark of the young wood of the previous season's growth. There would seem to be two and a partial third brood during the season so that here again success depends on effective control measures during the early stages. Nicotine sulphate—1 part in 800 parts—can be added to the arsenate of lead spray when the nymphs are first observed on the leaves; generally about the time of the first cover spray. As the insects live during all stages of their existence on the undersides of the leaves, particular attention should be given to directing the spray so that it will reach them in that position.

Weather conditions lately have been rather favourable for the development of "Black Spot", a fungus disease of apples and pears. In order to minimise primary infection, ploughing should be completed before the buds burst and dead leaves should remain buried as long as possible.

Spray according to programme recommended by the Horticultural Branch. Information is readily available on application.

Growers intending to rework unprofitable varieties of apples and pears should secure ample supplies of scions if they have not already done so, and bury them in a cool, moist place to keep them dormant. Advice and assistance in reworking is available to growers, if they desire it.

In conclusion, you have probably noticed that an apple and pear publicity campaign is being conducted not only for the sake of an important primary industry, but for the benefit of the health of the public. We would like to see an increased consumption of this healthful fruit which contains lime, phosphorous, magnesia, and vitamins. The old saying "An apple a day keeps the doctor away" has long been superseded as doctors, dentists, and dietitians now recommend the eating of an apple after every meal. The apple is not only nature's own digestive, but it is a wonderful tooth cleanser.

Review of the Egg-Laying Competition for the Month of September

[By C. F. ANDERSON (Chief Poultry Adviser) and A. CLIFTON (Competition Attendant.).]

Weather.—Although the month opened with several cold and wet days the conditions rapidly improved and production continued to show a steady increase and is probably now rapidly approaching the peak for this season.

Practically all the leading birds are keeping up to the standard weight egg, which is now a minimum weight of 2ozs. with the exception of the Light Sussex bird No. 253 which has laid several 1⅞oz. eggs during the month.

In last year's Competition the weight of eggs fell off considerably in September but it appears likely that this year, due probably to a later season, the weight will hold a little later.

Performance of outstanding merit was registered in the Light Sussex section for September. This section shows a production of 71 per cent. as compared with 65.3 per cent. for the full competition.

Unfortunately, towards the end of the month broodiness was prevalent in the Light Sussex section. Broodiness, however, especially with heavy breeds usually follows exceptionally high production, particularly at this time of the year, and as broodiness will become more accentuated when the warmer weather arrives, production will then show falling off.

It is interesting to note that in this particular section the team of Sussex entered by Mr. A. G. Ferguson laid the excellent total of 37 first grade eggs out of a possible 42 for one week. These figures show fairly definitely that there are possibilities for fairly high egg production in the Light Sussex breed when they have been bred for a few years longer.

The deaths for the month were the highest for any period of the Competition, namely 6. Four of these deaths were due to ovarian cysts growing on the oviduct.

The production for the month was 65.3 per cent. and the production of first grade eggs was 84.6 per cent.

Suggestions for Improvements in the Keeping of Farm Poultry

[Paper read at the Forty-eighth Congress of the Agricultural Bureau, September, 1937.]

[C. F. Anderson, Chief Poultry Adviser.]

Introduction.

This paper is written with the object of pointing out some of the weaknesses in the poultry industry that are apparent to one who has the opportunity of following all of its phases, from the setting of the eggs for hatching to the final product arriving at the marketing end, either as eggs in shell or as table poultry, and especially from the angle of keeping poultry on the general farm. The poultry industry in South Australia has grown from the position when the State was first producing only sufficient eggs to supply the local market. When supplies increased, the State began exporting interstate, and finally production became such that sufficient supplies were available for overseas exports. Each stage of this development has naturally been an advancement, and the fact must not be lost sight of that the consumers generally have been gradually educated to purchase only the best quality farm products, and this is particularly so with regard to eggs.

Another all-important point is—producers should realise that it is their duty to produce the article that the consumer desires, not to try and force on consumers something they do not want. There is no doubt that for many years poultry have been more or less despised on the general farms; that being so, producers must look to themselves to account for the poor returns received in numbers of cases. For the greater period of the year there is no reasonable excuse for the production and marketing of a poor-quality product. In almost every district of the State one can see consignments of eggs arriving in good condition, while from the same districts quite a lot of consignments are of poor condition, indicating the possibilities of marketing a good product on one hand and the weaknesses of methods practised on the other.

One of the objects of this paper is to endeavour to indicate where some of the faults lie. Before proceeding far, it should be recalled that the quality of the product depends on several factors, and I would point out that there is a good deal of difference between the term "new laid" and our "export quality egg." A number of producers believe that because an egg is new laid it is of the highest quality, but unfortunately such is not always the case. Quality depends principally on the health of the stock, and this is governed largely by two principal factors—housing and feeding. It is necessary, where quality in product is desired, that the stock be in a condition that will enable this to be done.

I intend to deal with the more important factors necessary to have the stock in the best condition, and there are many details that come into the question.

Stock.

It is not intended to differentiate between breeds, as any breed that is properly bred and is also housed and fed properly will produce a good quality product. The principal point to consider, however, is the breed that will produce sufficient to be successful commercially.

In the choice of a breed one should first consider suitability to the district; this is a question that must be left to the producer himself. The other factor is the favouritism or otherwise of the breeder for any particular breed. This is important, for if the person has no inclination for the breed he is to handle, he would be well advised to leave it alone.

There is not, however, a very wide choice, the principal breeds in this State being Light breeds, such as White Leghorns, Brown Leghorns, and Black Minorcas, and of the Heavy breeds, Black Orpingtons, Rhode Island Reds, and (latterly) the Light Sussex.

Whatever is decided on, certain principles in breeding should be followed. Get the best stock for the foundation that is available. Breed only from matured two-year old or older hens that have been known to lay well and a standard egg during the first laying season. One should never use a male bird in the breeding pen that has not been pedigreed bred; sufficient importance is not given to the selection of the male bird. Pedigree, however, is not the only factor to consider.

The bird should be of reasonable type, and moreover, fully matured before being placed in the breeding pen. This is a very important point. Far too much reliance is placed on first season male birds for breeding. Where early breeding is practised, the cockerels are not sufficiently matured to breed from, and every breeder of poultry should have at least 50 per cent. of his stud male birds of two years old or more; in fact, a good pedigreed male bird can be quite safely retained for years for breeding.

Be careful of the very high egg-producing hens, such as 280 or 290 egg hens, as breeders, as more often than not, the eggs from these hens do not hatch. The ideal breeding hen is that bird which lays from 220 to 240 first-grade eggs in her pullet year.

Season for Breeding.

In a climate like South Australia, the time of breeding is most important, as it is a relatively short season; the time of breeding is one of the factors where considerable improvement can be made with the majority of farm poultry. Strictly speaking, we have very little more than eight to ten weeks suitable for what is termed "Spring Hatching" in South Australia, and the major portion of the hatching, from a farm viewpoint, is done outside the season; particularly is this so where hens are used as the medium for hatching, and I am afraid that in a climate like South Australia it is very difficult to rely on hens for this medium, for the principal reason that it is too late in the season. August and September are the two months favoured for hatching, and if it is desired, a small hatch could be done in the summer, hatching during the latter part of February, and extending through March. I particularly refer to hatching, not setting—that is, the end of September would be the latest date to have chickens hatched in the spring, and the end of March is the latest for the summer hatch.

Incubation.

Assuming that incubation is followed, then every avenue of wastage should be avoided. The manufacture of incubators, particularly the all-electric type of machines, has made very rapid headway during recent years, and nowadays breeders obtain high percentages of hatching which were previously thought impossible. I would, however, point out here that the percentage of hatchings is not the only factor aimed at. It is the rearability that is of equal importance; in other words, it is of no benefit to have an 80 per cent. hatch of a class of chicken that is difficult to rear. It is better to have only a 70 per cent. hatch with a better rearing result.

Reverting, however, to farm conditions, reliance from an incubator is made on the small type kerosene heated machine, varying from 30-egg capacity to 500-egg capacity type, and this, when properly worked, gives quite satisfactory results. Again, however, it is quite easy, by faulty working, to spoil many eggs. Figures are always dangerous to try to forecast in regard to breeding with any livestock, but under efficient management, an average of at least 60 chicks for every 100 eggs set should be attained, and with attention to the more important details as set out here, that percentage should be maintained.

Successful incubation depends largely on three factors:—(*a*) A suitable class of egg for hatching; (*b*) evenness of temperature during incubation; and (*c*) attention to humidity or moisture during incubation.

SUITABLE CLASS OF EGG FOR HATCHING.

Firstly, the egg should not be saved for incubators until the hens have been mated for at least two weeks. In the selection of eggs it should be understood that some of their defects are of a hereditary character, and it is therefore wise to reject from incubation eggs which do not conform to a reasonably good standard of shell texture, shape, and, more important, size. For ordinary flock breeding the minimum should be 2ozs., and for the breeding of cockerels for stud purposes the minimum should be set at 2¼ozs. The eggs should be quite clean before being set. The cleaning of eggs does not affect the hatching of them, provided reasonable care is used. What is meant by "reasonable care" is to have the water just lukewarm, and where egg-cleaning machines are not in use the eggs should be cleaned with a rag moistened in lukewarm water, allowing them to dry before placing them on the trays. Set the eggs regularly, and do not hold them too long after being laid. Set them at least once a week, and for the best results, twice a week.

If eggs are being purchased and have been transported some distance, rest them for 24 hours before setting. It is also an advantage to test the eggs before setting for incubation. By this means, eggs showing small spider cracks, difficult to detect with the naked eye, blood spots, or extra large air cells can be rejected. These eggs seldom hatch satisfactorily.

EVENNESS OF TEMPERATURE DURING INCUBATION

Temperature is probably the controlling factor in successful incubation, and the maintenance of an even temperature during the whole period of incubation is the first essential towards successful hatching. I am speaking now of the smaller types of kerosene-heated machines. Evenness of temperature is only possible where a room that is not affected very much by outside weather conditions is used for incubation —that is, a room which holds the temperature reasonably well, and is not subject to extreme fluctuations. That is why, for this type of machine, an underground room or cellar is to be preferred.

I fear that the importance of regular temperature is not fully recognised; frequently one hears remarks: "Oh, the temperature went up to about 107° or 108°, and it might have been up there for some hours; we will just have to take a chance and see what the hatch is like." For temperature, I would advise 103°.

A particular aspect of incubation in the smaller machines is to run the temperature with the bulb of the thermometer resting on a level with the eggs, not some 2in. or 3in. above the eggs, as one frequently sees on some makes of incubators. Maintain this temperature of 103° as nearly as possible right through the time of incubation. When the eggs begin to chip on the nineteenth or twentieth day, the temperature will probably increase to 104° or in some cases 105°, but if the regulator of the machine is working satisfactorily, no harm will result. It is a normal condition with this type of machine.

The turning should be commenced after the eggs have been 48 hours in the machine. Just remove the eggs, turn quickly, and replace in the machine. Do the turning in the warm part of the day, not in the cold morning or evening, as is often done, as the continual turning and airing under these conditions chill the eggs, and poor hatches result. This is one of the principle causes of "dead in shell."

ATTENTION TO HUMIDITY OR MOISTURE IN THE INCUBATOR.

Place the moisture pans in the machine, and fill with warm water when the eggs are placed in the incubator. Replace this every day with clean water right up to the time of chipping. When the first eggs are chipped, close the machine up, and do not interfere any further until the hatch is ready to be taken out.

Before a further batch of eggs is set in the machine, scrub the machine out with 2 per cent. formalin and water mixture; leave the machine open all night to dry out thoroughly. It is then ready for a further setting.

Rearing.

Under farm conditions, accommodation for rearing is often not sufficient, and this is one of the weaknesses in poultry keeping on a farm. Without proper brooder equipment and where a number of chicks is hatched, it is difficult to rear the stock satisfactorily. During recent years, however, considerable advancement has been made on the brooding side. I refer particularly to the battery type of brooder, which can now be obtained to accommodate from 100 chicks up to almost any required number.

Whatever type of brooder is required, the essentials are, again, evenness in temperature, adequate ventilation without draughts, and proper feeding. I would advise a temperature of 90° to 92° when the chickens are first placed in the brooder, with the thermometer on the floor of the brooder, and also make sure that the lamp is sufficiently powerful. One of the great weaknesses in quite a number of brooders is a lamp which is not sufficiently powerful to hold the temperature throughout the night, and particularly in the early hours of the morning.

Frequently it is necessary to turn the lamp too high, with a result that the lamp smokes and the chickens are choked with the kerosene fumes. If the existing lamp is not strong enough to maintain the required temperature, replace it with a bigger one. This may mean the risk of the other fault—over-heating—and this should also be avoided. Over-heating will cause heavy losses in brooding, as will underheating, and the aim should be a maintenance of evenness in temperature at somewhere about that previously mentioned—that is, from 90° to 92°.

If the colony type of brooder is being used, be sure the chickens have fresh scratching litter, with hay chaff or cocky chaff to sleep on each night. It is not necessary to re-litter the whole brooder each day, but just where the chicks sleep. A good plan is to use bags. Sprinkle a little chaff on to the bag each night, and replace the bags every 24 hours.

Provide plenty of exercise, feed regularly; particulars of feeding can be had on application to the Department of Agriculture. Providing the chicks have had no setbacks during the brooding stage they should be ready when they are three weeks old to be transferred to cold brooders.

When the chicks are taken to the cold brooders the ideal type is a portable one, the brooder being built sufficiently large for the chicks to be kept in it for two or three days at a time (in case exceptionally bad weather is experienced), and yet are handy enough to be moved at least once a week on to fresh ground and grass. Do not be afraid to give the chicks as much free range as possible during the growing period.

When they are transferred to the cold brooders, separate the sexes. Keep the chicks moving for development. Do not stint the feeding; do not overcrowd; and aim to keep them on range in portable houses until they are from 3 to 3½ months of age, when they are then able to be moved into their permanent laying quarters. Plans of suitable types of cold brooders can be had also from the Department.

Housing.

The question of the health of the flock is influenced very largely by the housing and, as mentioned previously, unless every attention is given to the keeping of the stock in the best health, it is not possible for the birds to produce a high-quality product. One of the greatest dangers in housing is overcrowding. This should not be so under farm conditions, where plenty of land is available, and I would advise the construction of the house in units to hold as small a number of birds as can be commercially handled.

There is no question that the smaller the flocks the less risk there is of birds getting disease, and better production is usually obtained. I do not think, under farm conditions, that any more than 100 birds should be run in one flock. If it is possible to keep them to a minimum of 50, still better results would be obtained.

The house should be built—in this State —facing north, as the principal aim in housing poultry is to get the maximum amount of sunlight into the house during the winter months.

Water should be placed in the cool part of the house, and near each water pot a sand bath should be provided. This prevents the litter from becoming damp, which invariably happens if the water is just standing on the scratching litter. Damp litter is frequently the cause of an outbreak of chicken pox, colds, &c., during winter months.

Nests should be placed along the coolest part of the house where they are not exposed to the sun. Spray the perches during the summer months at least once a fortnight with any commercial disinfectant to keep them free from vermin, and at the change of season, that is, during the last week in March or early April. This is the time when outbreaks of chicken pox and colds commence, and they frequently continue right through the autumn and winter months when the price of eggs is at its highest.

Spray the sleeping quarters about one hour before the birds go to perch with a 10 per cent. kerosene and soap suds emulsion twice a week. It only takes a little while, and is often the means of preventing an outbreak of disease. On the first signs of colds or discharge from the nose or eye of the birds, make a solution of bluestone 1 oz. to 1gall, of water, and of that mixture add ½ cupful to ½gall. of drinking water twice a week.

Concentration should be on keeping the pullets free from trouble at this period of the year, as second and third year birds are not so liable to common poultry ailments.

Feeding.

There are very many methods of feeding available in this State, and one of the worst faults is over-feeding on the average farm. The feeding should be regular, and the quantities should be watched fairly closely.

The methods of feeding can be divided into three headings:—Wet Mash, Dry Mash, and the Soaked Grain method of feeding.

The standard wet mash adopted by the Parafield Poultry Station is 1 part bran to 2 parts pollard by weight, and on the basis of ½oz. bran and 1oz. pollard per bird; ½lb. to 1lb. meat meal per 100 birds, and chaffed greenfeed varying in quantity from 40 per cent. to 60 per cent. Wheat at midday at the rate of 1oz. per bird, and wheat at night. The foregoing quantities are the maximum.

If any other foodstuffs are grown on the farm and crushers are available, good results could be had from a morning mash of 1 part crushed wheat to 2 parts crushed barley with greenfeed, meat meal added, and 50 per cent. barley and wheat as a grain.

The soaked grain method of feeding is more or less in the experimental stage, but is being used by quite a number of breeders. The method is, for every 100 birds, 8lbs. wheat soaked for 24 hours. A percentage of water is drained off, and chaffed greenfeed and meat meal are added to the mash. This is fed twice a day.

Quality.

Finally, I would like to refer particularly to the great importance of quality. It is difficult to understand the lack of attention given to the final product—that is, the eggs. One quite frequently sees places where expense in housing, stock, and equipment has not been spared, yet there is no provision for storage of eggs in cool temperatures, prior to being consigned to market.

In a climate like South Australia it is essential that a special room be constructed, preferably underground, where the eggs can be stored until the time they are consigned to market. Exposure to heat for a few hours during certain months of the year is sufficient for the eggs to be graded out as second grade, where the difference in price is probably from 2d. to 3d. per dozen. Do not allow the eggs to remain in the heat of the sun, even in the poultry house, during the hotter months. If a collection were made about mid-day to 1 p.m. it would be found that the bulk of the eggs is laid by that time, and a big improvement in quality would be noticed.

Get them to market as quickly as possible after being laid—at least twice a week during the warmer months—so that the best quality product can be sold.

In this paper I have endeavoured to point out some of the most important factors which, if followed, I feel sure would greatly assist to improve the quality of our product, lessen the various wastages that do occur in poultry keeping, and ultimately benefit both the producer and the State.

The Re-Working of Orchard Trees

[By H. N. Wicks (Member of Advisory Board of Agriculture).]

[*Paper read at the Forty-eighth Congress of the Agricultural Bureau, September,* 1937.]

Market developments during the past few years have revolutionised orchard practices in regard to the number and the types of varieties cultivated in commercial orchards throughout this State.

Firstly, it would be as well just here to outline briefly the two different types of commercial orchards in South Australia—soft and hard fruits—the same remarks being applicable to both to a marked degree.

Prior to a few years ago, and before there was an appreciable amount of interstate and overseas business undertaken, the orchards of South Australia were given almost entirely to the production of numerous varieties in order to supply tl retailers in the city and suburbs as well as the country towns within reach of the distribution of the fruit placed on the Adelaide markets. The aim of most fruitgrowers at that time was to have numerous varieties in their gardens, which would enable them to keep harvesting fruit throughout the longest possible period of the year, marketing being a big factor and, in some instances, taking up the whole time of one man either in the markets or on the roads. In the more favoured spots in the State, where citrus could be grown satisfactorily, there was a very small period of the whole twelve months which was not given up to this marketing section of the business, and for this reason only a few trees of each variety in each section were planted with a view to obtaining a succession of ripening periods extending as far as possible over the whole year.

With the development of interstate trade and the overseas export business a distinct cleavage in orchard practice took place, with the result that one section still maintained what I shall term for the want of a better title, the mixed orchard, dependent upon the local market and given over entirely to the production of fruits suitable for that purpose, and another section which was developed with a view to the production of fruit suitable only for long distance transport. Some growers met the demands both ways by giving a section of their orchard to each sphere. This change has been very gradual in spite of the fact that the overseas markets developed very rapidly, and a number of growers, indeed, it would be safe to say the majority of them, did not realise what was happening until faced with the realisation that some of the varieties they were cultivating were not suited for the actual requirements of the market they wished to exploit.

As regards Apples and Pears, the foregoing has been very forcibly brought home to some growers, during the past two or three seasons, by the fact that numerous varieties have been disallowed from export by Government Proclamation. Studying the position from the aspect of the growers of these lines, it must be noted that, in the light of my previous remarks, the obvious action of growers who have been in the habit of marketing such lines overseas and now find themselves prevented from doing so, is to put them on the local market instead of the overseas centres. This might be all right if there was a demand for them, but the position has developed along somewhat different lines from those one might have expected. In other words, local market values have in a great measure followed those of overseas. In one way this is all to the good, although the undoubted quality of some of the prohibited varieties makes them eminently suitable for short distance transit, and the general utility of some of them cannot be disputed. Nevertheless, the very fact of them being banned from export is their condemnation, and to persevere with them would be folly and financial suicide.

What then can be done with these areas which, in numerous instances, are carrying trees which have only just reached their prime and are good for many more years of service? The answer is simple—either bud or graft them over to commercially profitable lines, providing the trees are not so aged as to preclude the possibility of making a good get-away after re-working. Whether budding or grafting is to be employed for the purpose depends entirely upon the type and condition of the tree, and is governed in a measure by the time the grower is prepared to wait for his trees to become profitable again after being reworked.

The methods mentioned above, budding and grafting, are the only two means of changing over the top of a tree to another variety, leaving the original root system intact. Although budding is often spoken of as a method of propagation quite apart from grafting, it is nothing more than a method of summer grafting and it obtained its name from the simple fact that only one bud or eye is used instead of several as is the case with a winter or spring graft.

The Theory of Grafting.

The fundamental principle on which the practice of grafting is based is purely a question of plant physiology. Plants have a definitely organised circulatory system. The food is taken in through the roots and passes upward through the outer layers of soft or sap wood. It is then carried into the leaves, where it is converted into the more highly organised compounds and made available for plant growth. Part of this material passes down the trunk of the tree on the line between the bark and the wood, thus completing the circulatory action and building up the so-called line as it flows into what is termed the cambium layer. This layer forms the wood cells on the inside and the bark cells on the outside thus becoming the connecting link between the two. It is this layer alone which can be utilised to join growing tissues or. in other words, it is the only portion of a tree which can be induced to unite with another portion of a tree under favourable conditions.

When a union is made between two different varieties of fruit it does not change the function of the cells of either, but each cell performs its usual duty in passing along the sap and in building up tissue. It is possible, however, that a piece of strong wood grafted on to a weak growing tree will be unable to secure sufficient service from the cells of the tree to make normal growth, and it is by this means that nurserymen propagate dwarf trees. A case in point is Glou Morceau Pear on Quince stock. It will thus be seen that the limits of grafting depend more upon the relationship of the stock and scion than on anything else.

For the purpose of this paper we will call the root portion of the tree to be worked "the stock," and the portion to be placed on such, "the scion." One vital point will be evident from the previous remarks, and that is the cambium layer of the stock must be in immediate contact with the cambium of the scion, or failure is inevitable. This being so, it will readily be realised that the greater areas of cambium which can be brought together the greater chance of success, and, not only so, but the stronger will the resultant union be throughout the life of the tree.

Time for Grafting.

The seasonable time to undertake grafting is in the Spring, just as soon as the sap is well on the move. This can be ascertained by a very simple test. When the sap movement begins in the Spring and the cambium becomes active, it loses its hardness which it has maintained throughout the winter months and softens, thus enabling the bark to come away from the wood freely. Hence, as soon as the bark can be lifted from the wood, leaving a clean, smooth surface, grafting can be carried out with every hope of success.

If the scions are properly treated, that is, placed in a well-drained moist spot away from the sun (a cellar being an excellent place) the base of the scions being plunged in clean moist sand or free loamy soil, grafting can be continued for quite a lengthy period, providing a little care is taken. I have grafted apples trees in December with excellent results, but owing to the rapid evaporation during the warm months of November and December the job becomes rather too technical for general practice, as the rapid drying tends toward failure if the utmost speed is not used. Scions for grafting should be removed from the parent tree during the winter months, tied in small bundles with the bases level, so that each scion will rest on a base of earth when plunged in the soil as outlined above. In South Australia, September is usually the best month in which to graft Apples and Pears.

Time for Budding.

As a general practice, budding is undertaken when the current season's growth has ripened and is firm and the eyes are matured and dark, usually from mid January to March in South Australia. Prior to this the eyes are tender, easily bruised and injured during the budding process. Early budding in September can be undertaken with eyes that are just beginning to move, but the practice has little to recommend it in orchard work, although sometimes very desirable in nursery practice. So far, my remarks have been applicable to deciduous trees, but would equally apply to citrus, with the exception of the times of application. Citrus can be budded successfully in late Summer and grafted in early Spring very successfully, so that it will be seen that the time of application is almost reversed or may be so, although the citrus offer a wider range for the operations generally than do the deciduous trees.

Equipment.

The necessary knives and implements used in both grafting and budding must be extremely keen, in fact should have a razor edge.

Whether the process be grafting or budding, the immediate tying of the union with its consequent exclusion of air from the wound is one of utmost importance. If the type of graft to be used does not admit of the union being tied, then a plastic wax of any well known formula must be applied to exclude the air directly over the wound, but if tying is necessary the wax should go over the top of the tying material, thus making the whole joint as air-tight as possible.

Varieties.

Now let us deal individually with some of the more commonly used types of fruit trees and the easiest way of working them over. Amongst these would come Peaches, Apricots, Almonds, Nectarines, Plums, and Prunes. At least three of the above can be grouped together—*Peaches, Apricots* and *Nectarines*—and the same remarks would be in a great measure applicable to them all. The first consideration in dealing with any of these is the age of the tree to be treated, and if the tree has given twelve or fifteen years of service then I would very carefully consider the physical condition of the tree before undertaking a work-over. Especially do these remarks apply to Peaches and Nectarines, as neither of these are long-lived trees in our climate and, generally speaking, it would not pay to try and re-work aged trees in these lines, as the remaining term of service would not warrant the time and trouble. Assuming the trees are in their prime—at about eight to ten years of age—then they will probably pay for re-working, and the surest and best way of attaining this end is to cut the trees back very severely into the aged wood during the Winter, trimming the wounds with a sharp knife and painting the wounds with paint or Bordeaux paste.

During the early Spring the tree will throw out numerous shoots which should be thinned out to the number of leaders it is desired that the new tree should have as a framework. Place a bud in each of these arms during the early Summer, and if irrigation is practised it will be possible to cut the limbs off about six inches above the bud a fortnight after budding, and if the tree is kept growing by the use of an irrigation or two, the buds will send out a late Summer growth and by Autumn will have made some inches of growth. These can then be pruned hard during the following, Winter and during the next Summer vigorous growth will result.

I have known Peaches treated in this way to carry quite a number of fruits the second year from the bud.

Treat *Almonds* the same way, but they can be worked over when much older.

Budding.

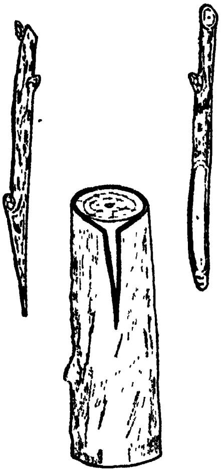
The process of budding is known to most orchardists and needs little elaboration here, other than to say that the buds should be firm and matured. Select a clean, healthy spot to make the incision in the stock, making a cross or horizontal incision with the knife about half an inch in length. Immediately below the centre of this incision and about three quarters of an inch below, insert the point of the knife and press the blade through the bark until the wood is felt under the blade, then draw upwards until the cross incision is encountered. If the blade is given a slight twist before being withdrawn it will have the effect of raising the corners of the bark. The knife is then turned over and the bone wedge of the handle used to raise the bark on both sides of the vertical incision.

To remove the bud from the bud stick, which should consist of a shoot of current year's growth, with the leaves trimmed off, leaving about an eighth of an inch of stem only, hold the bud stick in the left hand and upside down. Insert the knife about half an inch above the eye which is to be removed,'that is to say about a half an inch above the bottom of the bud, the bud stick being in reverse position. Press the knife inwards and downwards, cutting under the eye to a depth of from an eighth to a quarter of an inch, cutting straight for an inch and then running the knife out. Grasp the bud thus removed in the right hand and with the left hand remove the small chip of wood which is left in the shield, making sure that when this comes away it does not pull the centre out of the eye.

Insert the bottom of the shield into the top of the incision of the stock, press down until it reaches the bottom, remove the superfluous ''tail'' of bark on the top by pressing the blade of the knife across it immediately above the cross incision, and the bud will fit into its place snugly and firmly. Tie very firmly with raffia, making sure that the eye is neither injured nor covered by the tie.

Grafting Plums and Prunes.

The foregoing remarks under ''Varieties'' and Budding'' are also applicable to *Plums* and *Prunes,* but the buds do not take anything like as freely as Peaches and Apricots, and for this reason grafting is often by far the best method of changing over these fruits. The easiest and surest way of grafting them is to head the tree right off about three or four inches below the ground level and then place three or four bark grafts around the circumference of the butt. Tie the grafts securely, cover with wax and then earth up to within an inch or so of the top of the scions.



Bark Graft.

[From ''Propagation of Tree Fruits'', B. S. Brown.

The bark graft just mentioned is perhaps the simplest of all grafts to apply. After the tree has been headed off and the top of the stump trimmed smooth with a very sharp knife, the knife is drawn up the side of the stump, commencing about two inches from the top and pulling the knife upwards, cutting through the bark until the wood is felt under the knife.

At the point where the cut reaches the top trimmed edge the blade of the knife is given a twist which will serve to lift the corners of the bark where it is at right angles to the upward cut. As long as the bark is sufficiently lifted at these corners to permit the insertion of the wedge point of the scion it is sufficient.

Prepare the scion by cutting a one-sided wedge, cutting well through the scion before commencing on the downward cut and tapering out to a thin edge about two inches from the commencement of the cut. Insert the scion-cut-side inwards and push firmly down to the full length.

The illustration will give some idea of the operation. If the stock is large quite a number of these scions can be placed around its circumference, thus minimising the danger of complete failure.

Tie firmly with twine and earth up to within an inch of top of scion. Waxing is unnecessary.

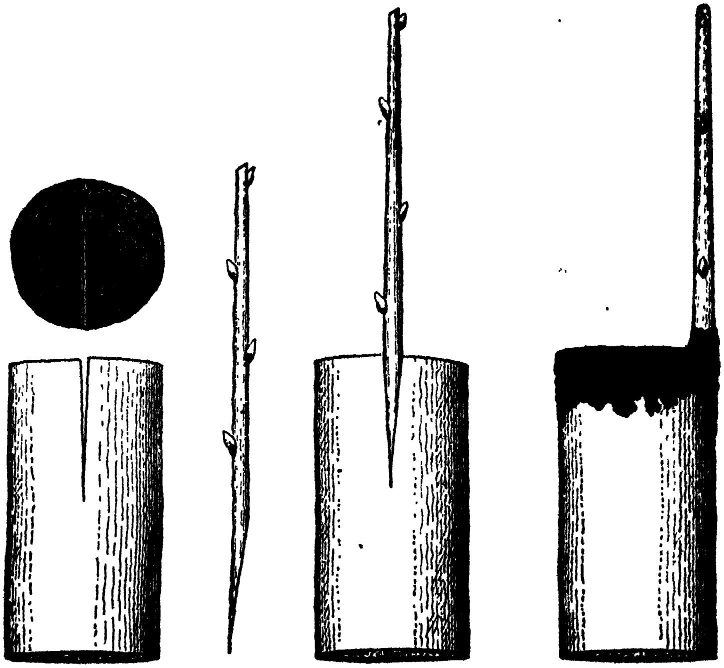
Cleft Graft.

The only other satisfactory method on large stocks is to cleft graft, in which case the preparation of the stock is the same as regards cutting off and trimming, but by the use of a long, sharp-edged draw knife or similar long edged tool the stock is split across the centre.

The scions are prepared by making a two-sided wedge about one and a half inches in length, then by prising open the split with a chisel or other wedged-shaped tool, the scions are forced down into the split, making certain that the cambium layer of both scion and stock are in line. Two scions, one at each end of the split can be used in this way, thus giving the job two chances of success.

If the graft is very firm, tying is not necessary, but if not, the graft should be tied in very snugly with twine and the whole job earthed up to within an inch or so of the top of the scion. Waxing is not necessary.

After the first Summer's growth, select the scion which has made the strongest growth and after making sure that it has made a good union with the stock, trim it up to shape and then remove the other scions. If a multi-stemmed tree from the ground up is not an objection then several of the scions can be left and a tree formed from them. Treated in this way Plums will often make phenomenal growth during the first year, six to eight feet of wood not being at all uncommon.



Stock *Cion* *Cion Inserted* *Wax Applied*

Cleft Grafting.

[From "Propagation of Tree Fruits", B. S. Brown.

It is always advisable to drive a strong stake firmly into the ground close to each graft of this nature, tying the young growth to it as required, thus eliminating the danger of breaking out in a strong wind.

A point to watch in the budding or grafting of Plums is that, although quite a number of Japanese varieties succeed well on the European type, the reverse is not always the case, some of the Europeans having a decided objection to making a stand on the Japanese stock. This lack of affinity one way is so far inexplicable and needs a lot of research to ascertain which will succeed and which will fail. For this reason, I cannot recommend working European Plums on to any of the Japanese varieties above ground, but would suggest that the grafting be done as outlined above. In this way if there is a lack of affinity, the scion will in time take root of its own accord and thus become a tree on its own roots, discarding altogether the original stock which will die, providing all other shoots but the scion are removed.

If budding is preferred, Plums may be treated similarly to the treatment outlined for Peaches and Nectarines.

Grafting Apples and Pears.

Apples and Pears are probably the most important lines to be discussed under the title of this paper at the present moment, owing to the fact that the Apple and Pear Council have seen fit, and rightly so, to prevent the export of any but select suitable varieties for overseas markets, and, as quite a number of these varieties are not at all popular on the local market it is essential either to discard or re-work.

Fortunately, both Apples and Pears are very long-lived, and respond to either budding or grafting very readily, and with certain precautions the re-working of these can be both efficient and rapid The following remarks are in the main applicable to both Apples and Pears.

There are numerous types of grafts by which a change over can be effected and the actual type or method to be used is chiefly governed by two factors—time available for the job and size and condition of the tree.

It is impossible to set down a hard and fast rule as to the age at which one method would become impracticable or inadvisable and another method prove satisfactory owing to the varying growth of the trees of the same age in different localities.

It can be safely asserted however that where the trees are comparatively young and thrifty, with main arms not above 2½ inches in diameter, it is quite safe to head the tree hard back, leaving as many short stumps as possible, placing a cleft or bark or, best of all, a strap graft on each stump, binding them tightly and waxing over the binding. Should a graft on any one stump fail or be injured, then, by allowing a shoot to get away from close to the head of the stump, a bud can be inserted during the following summer months and the gap thus filled with the bud. So much for a young and thrifty specimen.

Let us now consider trees which may have been in bearing a number of years and are large specimens with heavy leaders. Cutting these right off to a short branched stump, as mentioned for the younger tree, is quite practicable and efficient, but the operation is accompanied by a certain amount of risk. The large tree receives a bad shock upon receiving such drastic treatment and for a time reacts, or in other words takes a little time to recuperate and heal the wounds which, of course, must be large and severe. While the tree is in this weakened condition, disease will often attack the wounds and cause serious trouble. By careful treatment, however, this can in a large measure be avoided by treating the wounds with Bordeaux Paste.

This drastic method has the advantage of needing only a small number of grafts per tree. Thus, a fairly large acreage can be covered in a comparatively short time and, if properly and successfully carried out, extremely rapid growth will result only a short barren period will be necessary. Trees thus worked also have another distinct advantage in that they are completely worked over, whereas the method I intend to outline next will need careful watching for a number of years to keep the parent stock out of the tree.

Porcupine Graft.

The method of rapid re-working by what is sometimes called the porcupine method is a quick way of getting trees back into profit and has the advantage of checking the tree very little more than a severe pruning. Against this is the extra time necessary, and the point just mentioned regarding the shoots which will, for a considerable time, intrude along the leaders.

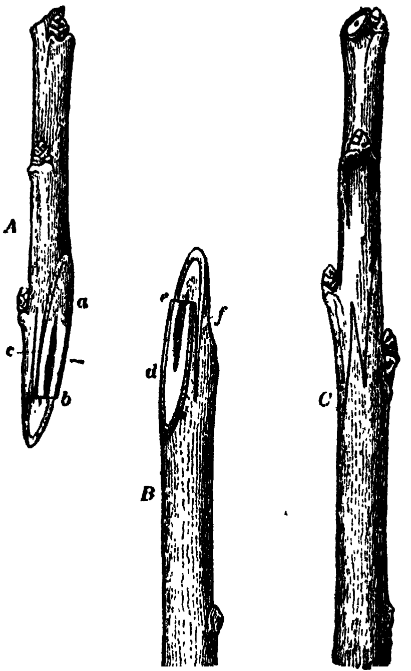
There are two main methods in this procedure. The leaders can be denuded of all lateral growth except, perhaps, a few shoots for protection against sunburn during the first few weeks, and the grafts can be inserted into the bark in a modified form of bark graft, merely tacking in the short scions with a brass tack and dabbing the wound with some plastic grafting compound to keep the air out. A large tree can be thus furnished with hundreds of lateral grafts, these being spaced as desired, and the tree can be brought into profit very quickly. A drawback, however, is the time necessary to cover a big acreage.

The second method is to trim the leaders of lateral growth, leaving those of a most upright nature spaced up the limb at regular intervals. By heading these laterals off and placing a whip graft in each as close to the main arm as possible, tying each whip graft firmly with a prepared tape, an extremely fine job can be made, as the whip graft is probably the strongest of all, and makes an extremely sturdy union which will withstand quite a lot of knocking about.

Whip Graft.

The whip graft, although a little more difficult than those I have already explained, is one of the surest and best of all for wood up to an inch in diameter.

Place the knife close to the base of the lateral which is to hold the graft and pull the knife through, making a straight faced angular cut of about an inch and a half to two inches in length, according to the size of the lateral to be worked. About two-thirds of the way up this sloping cut insert the knife through, making a straight faced incision about three quarters of an inch deep and running straight down the lateral.



Whip Graft.

[From "Propagation of Tree Fruits", B. S. Brown.

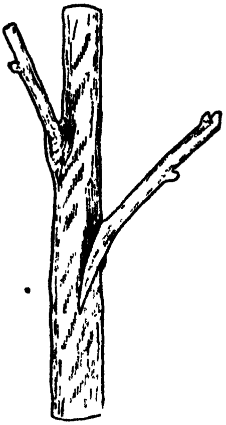
To prepare the scion, take it in the left hand and cut across the base, making the cut the same length as that on the lateral, reverse the scion and make an incision as nearly as possible resembling that on the lateral, commencing about two-thirds of the way up the cut and bringing the knife down about three-quarters of an inch.

Again reverse the scion and push stock and scion together, interlocking the tongues as shown, and making sure the cambium layers are uniting. The aim of the grafter in this instance must be to get one side of scion and stock lined up, as very rarely is it possible to get both sides to line correctly.

Tie very securely with raffia and cover with wax.

Side Graft.

Giving the stock similar treatment as that just outlined, another very simple and efficient method is to call into use what is commonly called a side graft. By this method the laterals to be grafted are left full length or nearly so, using the largest of them, including any sub leaders, available. These in their turn are denuded of all side growth up from the main limb a distance of six to nine inches to facilitate working.



Side Graft.

[From "Propagation of Tree Fruits", B. S. Brown.

To insert the graft, an incision is made a few inches from the main arm, cutting inwards and downwards, pushing the knife in about an inch to an inch and a half as if to cut the lateral through on an acute angle.

Prepare the scion, which should be about three to four inches in length, by making a wedge of its base, the length of the wedge to coincide with the depth of the incision in the lateral.

By taking the top of the lateral, and bending same away from the incision, the wound will gape or open with the tension. A little care is needed when doing this not to split the lateral by bending it over too far.

With the incision open, push the wedge-shaped scion well down into the gap, making sure that the cambium layers line up on the side where the scion is inserted.

Release the top of the lateral, and the scion will be found to be very firmly and efficiently held in the incision by the tension of the lateral.

With covering of wax the graft is complete with the exception of removing the surplus portion of the lateral, which has been used as a lever to open the incision. It is wise to use a sharp saw for this purpose if the laterals are large and the removal of the lateral should not be closer than six to nine inches from the graft itself. The remaining six or nine inches should be removed at a subsequent date when the graft has healed over and the trimming completed.

The Subsequent Treatment of Grafts and Buds.

The removal of ties from buds should be carried into effect about three weeks after budding has taken place, and consists of merely cutting the top and bottom tie and allowing the raffia to become free from the stock.

The growing bud should be given preference of growth by removing any shoots from the stock in the immediate vicinity and giving the bud the benefit of the full sap flow. If bud growth is very rapid it is advisable to nip the centre of the growth out as soon as the main stem has made sufficient headway, thus forcing lateral growth, keeping in mind the ultimate shape of the tree.

The ties on grafts, if underground, need no further attention, but if above ground they should be released after a few weeks when they can be seen cutting into the stock. It is a good idea to release the tie and then replace it for a further period until the graft has firmly and securely calloused over.

Our Present Knowledge of Two Common Diseases of Sheep—Infectious Entero-Toxaemia and Internal Parasites

[*Paper read at the Forty-eighth Congress of the Agricultural Bureau, September,* 1937.]

[C. T. McKenna, B.V.Sc., M.R.C.V.S., Veterinary Officer, Stock and Brands Department.]

These two diseases are of great economic importance to the sheep industry of the State. Their incidence in our flocks is high and their presence leads to loss of condition, with its attendant ills, and to considerable mortalities.

Fortunately, as the result of the investigational work which has, and still is, being carried out by Veterinary Research Officers working under the auspices of the Council for Scientific and Industrial Research, considerable advances have been made in their prevention and control.

The object of this talk is to give you a summary of our present knowledge of these diseases and especially of those preventive measures which have been adopted as a result of the above experimental work, and which will help you to reduce their incidence in your flocks.

INFECTIOUS ENTERO-TOXAEMIA OF SHEEP.

This disease is due to a special germ—the Clostridium Welchii (Type D). It has been found in the soil of affected properties and it apparently thrives in cultivated and improved soils. Healthy sheep take small numbers of the germs into their digestive canal along with food and water, without ill effects. However, under certain conditions, which are not yet fully understood, they multiply rapidly in the small bowel and in the process, give off a powerful *toxin* (poison) which is absorbed into the body of the sheep and so poisons it.

The following facts about Entero-toxaemia are known:—

1. It is confined to the agricultural areas of South Australia. It does not occur on bush country or in the pastoral portion of the State. Losses from it are high, in the wheatgrowing districts, and it is common in those high rainfall parts of the country which have been improved by top-dressing and the planting of clovers.

Its association with regularly cultivated areas is an outstanding feature.

2. The disease has a definite seasonal incidence in that outbreaks generally occur during late autumn, winter, and early spring. Our records show that Entero-toxaemia makes its appearance after the first rains of the season (April-May), that it continues throughout the growing period, and that it usually ceases when the feed starts to "go off" (October). It occurs typically when there is an abundance of greenfeed, rich in moisture (at least 60 per cent.) and poor in fibre content. Good seasons with a "flush" of greenfeed are considered to be the worst, whilst the disease is comparatively rare when dry seasonal conditions prevail. It may, on occasions, appear during the dry months of the year.

3. The following conditions under which it makes its appearance are outstanding:—

(*a*) During the early spring of the year mortalities are high amongst lambs which are being fattened for sale; it is usually the best and most forward ones which die;

(*b*) In the wheatgrowing districts the disease can also be severe at the beginning of the season when the history is invariably that the sheep were grazing at the time on Stinkwort (***Inula graveolens***). "Stinkwort poisoning" has, for many years, been the popular name for Entero-toxaemia, when it occurs under these conditions.

(*c*) The practice of grazing off rapidly growing green cereal crops with sheep often leads to the appearance of this disease in them. If the flock is moved off such feed the mortalities usually cease.

(*d*) Rarely it occurs during the summer time in sheep or lambs which are depastured on pea stubbles. In this case deaths often follow after a thunder-storm.

4. It is typically a disease of sheep which are in high condition. Farmers consider that cross-bred lambs which fatten and mature more rapidly than Merinos are more frequently affected than the latter. There is some evidence that the failure to take exercise which results from the high condition also plays a part in bringing about Entero-toxaemia.

On occasions it appears in sheep in poor condition, and its presence in such sheep is often associated with close grazing. It is presumed that under such conditions of feeding large numbers of the germs are taken in with the feed.

5. Entero-toxaemia naturally affects sheep only.

6. Sheep of any age from three weeks old onwards may be affected. In South Australia it is but rarely that the disease appears in young unmarked lambs; it is, however, very common in lambs two to three months or older.

Entero-toxaemia, and the condition known as "pulpy kidney" of lambs, are one and the same disease.

7. The disease is peculiar in that the mortalities from it vary considerably from year to year; it will appear in one district for one, two, or three years, and then apparently die out; again, it may appear on a certain farm whilst adjoining properties will be free from it.

Mortalities are greatest on farms or in districts where the disease occurs for the first time. On the other hand in those areas where the disease is well known the death rate is low except in flocks newly introduced from clean areas.

Symptoms.

Three types of the disease are recognised and all types may be present in one outbreak. The first, and by far the most common is the *Acute Type*. In this form the sheep die after a short illness (from one to two hours). The owner usually finds them dead on his daily inspection of the flock.

Occasionally symptoms are seen, especially if the flock is rounded up. A common picture is that which is seen in lambs. They lag behind, stagger, fall down and go into convulsions, *i.e.*, the head is thrown back, the eyes roll and their whites show, the limbs are held taut and there is twitching of the muscles, especially of the head. In other cases the affected animal is down and lies quietly or only struggles feebly.

The second type is a *less acute* one in which the affected animals linger on for two to three days before they die. Some of them become stupid and wander around aimlessly; they may champ their jaws and muzzle the ground or chew pieces of stick, etc., in an excited manner. Others go down and are listless; they will not eat, the breathing is rapid, there is evidence of diarrhoea, and bloating is often present. Occasionally recovery occurs.

The third is the *chronic* type, and in this form a percentage of the flock are affected with a foetid diarrhoea, and they lose condition. The area over which they have been grazing shows evidence of much fouling as a result of scouring. Such cases linger on for some time and there is no doubt that many recover.

In all types of the disease, the losses are never great at one particular time, but are spread over a period. The mortalities in an outbreak can, however, be high.

Post-mortem Appearance.

The owner on examining the carcass finds that it is usually that of a well-nourished sheep. Two or three hours after death, or even before that time, it is found to be blown up; those portions of the skin which are not covered with wool, are a dark-blue colour, and there is a frothy blood-stained discharge from the nostrils. These changes are due to rapid decomposition, which is characteristic of this disease. If one opens up the carcass at this stage, it is found that the paunch and bowels are full of gas and that they contain little, if any, solids. The kidneys are generally a dark-red pulpy mass. The heart sac contains an appreciable amount of fluid. There is a peculiar and characteristic odour present.

Control.

Once Entero-toxaemia has made its appearance in a flock, measures for preventing its spread are limited, often unpracticable, and frequently unsatisfactory. Fortunately, we have a safe, efficient, and economical method of preventing its occurrence. This consists in the inoculation, with Entero-toxaemia vaccine, of sheep and lambs prior to the period when this disease is expected to occur. The vaccine recommended is that manufactured by the Commonwealth Serum Laboratories. This vaccination builds up an immunity, *i.e.*, a resistance to this disease, in the sheep's body. This immunity tends to diminish at between three to six months after inoculation.

The directions for using this vaccine are as follows:—

(*a*) THE DOSAGE.

For Adult Sheep.—Two doses are given—one of 3 c.cs., followed by a second dose of 7 c.cs. four weeks later.

For Lambs.—Two doses are given—one of 2 c.cs., followed by a second dose of 5 c.cs. four weeks later.

The period of one month between doses is regarded as the best, but an interval of not less than 3 weeks and not more than 6 weeks would be satisfactory.

(*b*) THE INOCULATION.

There are two methods of doing this. The first consists in running the sheep into a drafting race. The race should not be packed too tightly. Vaccination is then commenced, and the operator and his assistant work from the outside of the race along its length. The site of the injection is behind the shoulder. The assistant opens up the wool over the area, and the exposed skin is swabbed with cotton wool soaked in methylated spirits. A 20 c.c. "Record' hypodermic syringe with a needle attached is used for the injection. The needle is inserted obliquely under the skin so that the instrument is more or less parallel to the body of the sheep. The required dose is then introduced; it should not be injected into the muscular tissue.

The second method:—The assistant holds the sheep in a sitting position on the ground. The inoculation is done on the side of the brisket near the forearm, and the technique is similar to the first method.

The inner aspect of the thigh is not a suitable position for the inoculation of lambs owing to post-inoculation blemishes. There is slight lameness for one or two days after the operation.

The vaccine is issued in glass containers, and the rubber stopper should not be removed until the sheep are ready to be inoculated. To make easy the filling of the syringe, a suitable amount of vaccine should be poured from the container into a small sterilised cup. As flies are attracted to the vaccine and there is always dust, it is very important that the vaccine should be kept clean by covering the mouth of the container and the cup with a piece of clean linen soaked in 1 part of commercial formalin to 9 parts of boiled water. Two or three hypodermic needles should be used, and they should be changed frequently. When not in use they should be kept in a vessel containing methylated spirits.

Unused vaccine should not be stored away for future use after the container has been opened.

Standing position for inoculating pregnant ewes or other sheep.

(*c*) STERILISATION.

Abscess formation may take place at the site of the inoculation, and in the case of fat lambs such an occurrence means that the carcass is rejected if for export, and may be condemned as unfit for sale. This abscess development is not due to the vaccine, but to dirty or faulty methods of the operator.

To ensure cleanliness of the instruments and small cup they should be sterilised by putting them into cold water which is then boiled for 10 minutes. Before putting the syringe in the water, the plunger should be removed from the barrel, and the latter should be wrapped in cotton wool. After sterilisation the syringe should not be assembled until it is cold.

The sitting position for doing the inoculation.

This position is not recommended for inoculating fat lambs.

The whole operation of vaccination should be done in a clean manner, and the above technique should be adhered to.

(*d*) How to Order the Vaccine.

A stock of Entero-toxaemia Vaccine is now held at the Commonwealth Health Department, Peel Chambers, Peel Street, Adelaide, and supplies can be obtained direct from there. No permit is required to obtain it. When ordering, give the number of sheep and lambs for which vaccine is required, and make arrangements for payment. It will be sent C.O.D. (post or rail) from Adelaide, and farmers should take advantage of this method of paying for the vaccine and freight. A pamphlet giving instructions for use of the vaccine is forwarded with it. Hypodermic syringes cannot be obtained from the Health Department, but are obtainable from the wholesale and many business houses in Adelaide.

(*e*) When to Vaccinate.

The vaccination of breeding ewes should be completed one month before lambing. If this is done the ewe is able to pass on to her lamb in the colostrum, or first milk, a certain degree of immunity, which probably lasts for the first three weeks of life.

The vaccination of lambs should be arranged for the first inoculation to be given at marking time. Marking should be done at a reasonably early age.

Other sheep should be inoculated so that the operation is completed about one month before losses from the disease usually occur in the district.

Whilst vaccination is the most important measure for preventing this disease, there are other methods which are of value. These are:—

1st.—The establishment of their own breeding flock, by sheepowners, in those areas where Entero-toxaemia occurs regularly. It has been found that flocks bred and continually depastured on properties where the disease is prevalent usually acquire a natural immunity in the course of several years. Freshly introduced sheep should be inoculated.

2nd.—The carcasses of sheep which die from the disease should be burnt or buried deeply. If left to rot in the paddocks, a heavy contamination of the soil with germs of Entero-toxaemia results.

Should this disease break out in a flock, one or more of the following measures are suggested:—One satisfactory procedure is to turn the affected flock on to bush country. Losses invariably stop three or four days after this movement. Of course, this method is limited.

Another method is to vaccinate the sheep, and if losses still occur after the first injection the second one should be given a fortnight later instead of one month later.

Still another suggestion is to change the pasture frequently. Finally, in the case of lambs, weaning usually checks the disease.

INTERNAL PARASITES OF SHEEP.

During the late Spring, Summer, and Autumn of each year, reports are invariably received from many parts of the State of a disease in sheep, mainly weaners, the main features of which are a failure to thrive, a persistent dark-coloured diarrhoea and weakness. The mortalities may be as high as 30 per cent., and in one outbreak 75 per cent. of the affected flock of weaners died.

Investigations have shown that the disease is caused by the presence of large numbers of parasites in the food canal of the sheep.

Parasitism is particularly prevalent in those high rainfall areas of the State where clover pastures are established and top-dressing is practised and where, as a result, the carrying capacity is high.

Its incidence varies considerably in different years; it is higher after good seasons than after poor ones, and this is because the same conditions that make for a good growth of feed are also suitable for the development of the parasites outside the sheep's body. In recent years, and especially after a series of good seasons, it has been observed that parasitism has become more widespread in the State, and has appeared in areas of lower rainfall, which were previously considered to be "clean."

The disease is a serious one, not so much on account of the actual losses, but because such a high percentage of the affected flock fail to thrive, lose condition, and produce tender wool and fleeces which are under weight.

The Cause.

Parasitism is directly due to the invasion of the digestive canal of the sheep by large numbers of various types of parasites. By far the most important and also the most common of these are the "Trichostrongyles" or "Hairworms," which are only ¼-⅓ of an inch in length, and are hair-like in appearance. They are found in the small gut, and particularly in the first 10ft. of its length. Owing to their small size they are difficult to see, and are easily missed on a *post-mortem* examination.

The female parasites lay eggs which are passed out in the faeces. Under suitable conditions, *i.e.*, warmth and moisture, these eggs hatch out and the young parasites migrate up the blades of grass and are taken into the alimentary canal of the sheep with the feed.

Types of Sheep Affected.

Lambs, especially those from 5 to 12 months old, are chiefly attacked. The disease makes its appearance shortly after weaning, and if they survive until they are 12 to 18 months old, they throw off the disease and rapidly recover.

Again, parasitism is frequently observed in ewes with lambs at foot, and in such cases it is interesting to note that, whilst the ewes are affected, the lambs in the early stages, *i.e.*, whilst the ewes are producing milk, appear quite healthy. Pregnant ewes are sometimes affected. It is but rarely that the disease is observed in dry ewes and wethers.

Predisposing Factors.

Whilst this disease is directly caused by internal parasites, there are certain factors which bring about this parasitic invasion. These predisposing factors as they are called, are:—

1. INSUFFICIENT NOURISHMENT.

This is by far the most important indirect cause of this disease. The condition of the animal determines whether the parasites will gain the upper hand or not. If the nutrition of the sheep is good they may be infested with considerable numbers of parasites without showing ill-effects. It is only when sheep start to lose condition, that parasitism makes its appearance. That this is so is evident from the behaviour of the disease. The majority of outbreaks occur during the dry period of the year when there is a marked "falling off" in the feeding value of the pasture, and especially in its protein content.

When sheep are confined to natural pastures or are run on wheat stubbles, such nutritional deficiency may be expected to take its most serious form during the late summer and autumn months. It is during this period that outbreaks of parasitism are most serious. Again, in support of the above statement, we find as I have previously said, that the disease mainly affects lambs, especially after weaning, which is generally at the time when the feed is "going off," and the lambs have then to face two severe nutritional checks. The first one is the loss of the mother's milk, and the second is the pasture which is deficient in those nutriments (especially protein) which are essential for the young rapidly-growing animal. The rate of growth is approximately 4lbs. per week.

Still further, parasitism not uncommonly appears in ewes with lambs at foot. In these cases the secretion of sufficient milk for the lamb depends on a supply of good nutritional feed (one containing a sufficiency of protein). If the ewe cannot obtain the nutriments from the pasture it uses up its own body reserves, with the result that loss of condition soon follows. The ewe's lamb is not affected whilst it can get a sufficient milk supply from its mother.

Finally, wethers and dry ewes are rarely or only slightly affected because they only have to maintain themselves and grow wool, and they can usually get sufficient nourishment to do this during the lean time of the year.

2. OVER-STOCKING.

This is the second predisposing factor. The reason for this is, firstly, that an overstocked property means that the sheep on it are getting insufficient nourishment during the lean part of the season, and secondly, that there is greater opportunity for the worms to circulate amongst the sheep.

Over-stocking is common in our better rainfall areas, where the carrying capacity is high as a result of the establishment of pastures and top-dressing. The disease is very common in such districts and it often occurs there during the winter months.

It frequently happens in these areas that the best part of a property is, during the feed shortage, heavily stocked for long periods, and under these conditions the parasites have every opportunity of establishing themselves in the sheep.

Symptoms.

The most constant symptom is a dark-coloured diarrhoea. The affected sheep are not doing well. When driven, they appear sluggish and can easily be caught. As the disease progresses they become emaciated, they will not feed, and they start to die. If an affected animal is examined at this stage it is found on parting the wool that the skin instead of being a salmon-pink colour, has a dirty white appearance, there is great emaciation, and the animal is weak. The disease spreads very rapidly in a flock of weaners, and in a few weeks the majority of them will show evidence of the condition.

In flocks in which the disease is not so severe, there are marked gradations in size, and a "tail" is developed, *i.e.*, a percentage of the sheep are markedly undersized and in poor condition. There is evidence of diarrhoea amongst many of them.

Post-mortem Examination.

The outstanding feature in well-advanced cases is the extremely emaciated condition of the carcass. There is very little fat present, and the muscles are pale and watery. On opening up the belly cavity a considerable amount of watery fluid is seen there. A search for the parasites should be made in the fourth stomach and the first 10ft. of the small bowel. To do this, slit up the stomach and small bowel, and from various parts of their lining scrape off the material present. Put the scrapings on a clean piece of sheet glass, mix with a little water, and spread out. If a piece of dark paper is now put under the glass, and the mass is examined in a good light, the parasites can be seen.

Whilst medicinal treatment alone is not wholly satisfactory, good results have been obtained from the use of Copper Sulphate solution and Commercial Nicotine Sulphate (40 per cent.) combined. There are two mixtures of these substances available for use as a drench. They are:—

(*A*) 2 *per cent. Solution.*

Copper Sulphate	1lb.
40 per cent. Commercial Nicotine Sulphate	16 fl. ozs.
Water	5galls.
Doses—	
Adult Sheep	2ozs.
2-tooths (12-18 months)	1½ozs.
Lambs (8-12 months)	1oz.
Lambs (4-8 months)	¾oz.
Lambs (under 4 months)	½oz.

(*B*) 5 *per cent. Solution.*

Copper Sulphate	1lb.
40 per cent. Commercial Nicotine Sulphate	16 fl. ozs.
Water	2galls.
Doses—	
Adult Sheep	20 c.c.
2-tooths (12-18 months)	15 c.c.
Lambs (8-12 months)	10 c.c.
Lambs (4-8 months)	8 c.c.
Lambs (under 4 months)	5 c.c.

In preparing both solutions, use only hard blue lumps of Copper Sulphate (bluestone), and discard all lumps which are white and powdery. Break up the large lumps, and dissolve in a portion of the water which has been brought to the boil, then add water to make the mixture up to 5 (or 2) gallons. Finally add the nicotone sulphate solution. Mix in an enamel bucket.

A set of four glass bottles for the various doses are advised for drenching even a large mob of sheep with the 2 per cent. solution.

Suitable bottles are made by the glass manufacturers. A hole should be filed or drilled (there are firms who will undertake this) in the side in such a position that when it is plunged into the solution it will fill up with the exact dose.

There are also suitable drenching guns on the market. The 5 per cent. drench is easier to give than the relatively larger 2 per cent. drench. The mixture can be stored in a stone jar, but if kept for any length of time it should be strained through a piece of fine cloth to remove the deposit which is present.

In using either drench, the dose should be repeated twice at 10 days interval, and then every 21 days. If the sheep are weak the next smaller dose should be given. Care should be taken to see that the exact dose is given as the margin of safety is small, and double the dose recommended is poisonous for lambs. *The sheep should not be starved before or after drenching.*

As well as giving the above medicinal treatment the affected flock should be given the best grazing available, and fed on such rich supplementary feed as oats or other cereal grains, linseed nuts, good quality clover hay, ensilage, or lucerne. In a badly-affected flock the worst of the affected sheep should be drafted off and handfed in a small paddock or yard. If the affected animals are not used to hand-feeding, a few sheep accustomed to this method of feeding should be put in with them.

In severe outbreaks of the disease the problem is to get the affected sheep, especially if they are weaners, to eat.

Control Measures.

The sheep owner should look upon an outbreak of Parasitism in his flock as an indication of faulty sheep management. The following control measures are suggested:—

1. Increased attention should be given to ensure a satisfactory state of nutrition of lambs from the time of weaning until they are 12-18 months old. This should begin before they are seriously lowered in condition, and their resistance to worm invasion correspondingly impaired. It may prove ineffective otherwise.

It is undoubtedly good farming to prevent the lowering of the resistance of lambs by beginning supplementary feeding at an early date, preferably educating them to this before weaning.

One main difficulty is to supply supplementary food comparable to green fodder, which is particularly valuable to susceptible animals.

The supply of good green oaten (or wheaten) hay, of which the protein content is increased by harvesting peas with it, should prove of value. In some cases good quality silage can be supplied, and this is an invaluable food. The growing of special oat crops, which the lambs should be allowed to harvest, has been tried with success. Root crops can, in many areas, be grown, and are a good feed. In the improved pasture areas, good quality clover hay is of value, and its use should be continued through the late autumn and early winter. The cereal grains, of which the best for young growing sheep and the production of milk is oats, are of high value as a supplementary feed. Further, the establishing of certain suitable pasture grasses, such as *Phalaris tuberosa*, Wimmera Rye, &c., will, in certain areas, be satisfactory, whilst the value of lucerne (even of a light sowing) is too well known to need comment.

Finally, the employment of supplementary feeds of high protein value such as linseed meal, peas, and meat meal, may be tried when expenditure on such costly feeds is economically sound.

Self-feeders are of great value in carrying out supplementary feeding.

2. *Pasture Management.*—It is essential that a system of rotational grazing be practised so that sheep are not kept too long on one particular paddock, and so exposed to heavy infestation with young parasites. To ensure this, the property must be sufficiently subdivided.

Finally, close grazing should be avoided, as this makes for heavy worm contamination in susceptible sheep.

3. The provision of a salt lick. Coarse salt should always be available.

4. Burning off of pasture has in some areas been successful in destroying the eggs and young parasites.

5. The watering of sheep from troughs, and not from dams.

6. Rabbit destruction.

Orchard Soils and Fruit Tree Nutrition

[*Paper read at the Forty-eighth Congress of the Agricultural Bureau, September,* 1937.]

[By A. G. Strickland, M.Agr.Sc. (Chief Horticulturist).]

Soil management designed to maintain and improve fertility is an important feature of all farming practice, but in the case of orchard land, is of particular importance in consequence of the semi-permanent nature of orchard plants. Fruit trees, being perennials, are usually intended to occupy the same land for a long period of years, and any progressive deterioration in the fertility of the soil which they occupy, involves depreciation, and perhaps loss, of a substantial asset.

Fertility of an orchard soil involves more than its plant food content, and cannot always be maintained or improved merely by cultivation and the application of artificial fertilisers. Fertility level is intimately connected with such factors as depth and topography of the soil, its drainage properties, the amount and nature of the cultivation it receives, the extent to which organic matter content is maintained, and many other factors too numerous to specify.

Presuming that a soil is reasonably well suited to the growth of a particular fruit crop, and that grossly adverse conditions, such as saline accumulations, or waterlogging do not prevail to any marked extent, there is still necessity to maintain and, if possible, improve its fertility level.

All soils devoted to fruit growing are not such that they are incapable of improvement, and, moreover, even the best types of soil will deteriorate markedly during the lifetime of an orchard, unless measures are taken to conserve their original fertility.

Green Manuring.

Orchards in South Australia are generally clean cultivated during spring, summer, and early autumn, a system of soil management, which although necessary for conservation of soil moisture, leads to gradual but certain loss of organic matter or humus; such loss of organic matter must be made good by means of annual additions of that material. Stable manure. straw, lucerne, distillery refuse, &c., may be applied to the land with this object in view, but the generally accepted and most convenient method of adding organic matter is by ploughing under in late winter or early spring of a large bulk of green stuff grown throughout winter between rows of trees.

This green stuff may consist of a crop of peas, beans, barley, rye, or other suitable plant which has been sown in early autumn; in other instances, it may consist of miscellaneous weeds permitted to develop by cessation of cultivation in early autumn, and perhaps encouraged by a light dressing of artificial fertiliser broadcast between the trees in autumn.

The indirect advantages of winter green cropping (or, as an alternative, winter weed growth) are many; to quote two such advantages, green crops aid in the prevention of soil erosion in hilly country, and they act as efficient drainage systems in soils which tend to become waterlogged in the rainy season. Water erosion of soil on steep slopes has of itself been responsible for appreciable loss of fertility of portions of many orchards in the Mount Lofty Ranges, in that the most fertile portions of the soil profile have been almost completely removed over a period of years. Most important, however, are the facts that green cropping in some form or other is the only economic method of maintaining the organic matter of the soil on large areas, and that maintenance of organic matter is the most important single factor in orchard soil management.

At this juncture, it is worth while quoting conclusions reached by the Pennsylvania Agricultural Experimental Station in United States of America from orchard fertiliser experiments conducted over a period of 25 years; I quote:—

"Any treatment that has influenced the fruit trees at all has done so in the following order:—First, the cover crops; perhaps several years late, leaf colour; shortly after, branch growth and circumference increase, and last of all, yield.

"The reason for this sequence of results is that the treatments—whether chemical fertilisers, manure, or cover crops—have influenced yields, chiefly by changing the organic matter content of the soil; that is, those treatments which have resulted in the production of larger cover crops have ultimately resulted in the production of more fruit."

Fertilisers for Green Manure Crops.

Artificial fertilisers have definite value in connection with green manurial practice, and their use in this regard may conveniently be considered separately from their use as direct applications to fruit trees.

As previously stated, green stuff for spring incorporation with an orchard soil may be secured in two ways—by deliberately sowing a green crop in autumn, or by encouraging volunteer winter weed growth between the trees.

In the case of sown green crops, those of a leguminous nature—beans, peas, &c. —will usually benefit considerably if sown together with 1cwt. to 2cwts. of superphosphate. In cold districts or in soils which tend to be sour, peas or beans often make poor growth, and under such conditions, a cereal crop such as barley or rye, will generally yield a bigger bulk for ploughing under; a cereal green crop will respond to superphosphate in a soil moderately well supplied with nitrogen, but in some of our Hills orchard soils, which over a period of years have become deficient in both humus and nitrogen, a green crop of the cereal type will respond even more markedly to a light application—say, 1cwt. per acre—of sulphate of ammonia.

Where volunteer weed growth is relied upon for annual production of green stuff, autumn broadcast applications of either superphosphate or sulphate of ammonia are again useful. If miscellaneous herbage consists largely or cape weed (or dandelions) and various grasses which make scanty growth during winter, it is probable that 1cwt. of sulphate of ammonia, broadcast in early autumn will result in much stronger growth of these weeds. On the other hand, if it is desired to encourage trefoils and other legumes, a better response may be obtained from autumn applications of superphosphate.

Fruitgrowers who rely on weed growth as their winter cover, and who are not altogether satisfied with its bulk, will find it well worth while experimenting with autumn broadcast dressings of superphosphate and sulphate of ammonia.

Fertilisers Applied for Direct Utilisation by the Tree.

Green manuring has been described as the most important phase of orchard manuring, but there is the additional necessity for more direct feeding of orchard trees by means of fertiliser applications at a time of the year when the tree is judged to be most likely to require some mineral supplement.

It should not be thought that such direct feeding is always essential for there are many rich orchard soils where there appears to be no immediate necessity for direct fertiliser applications to trees, or to express the matter more accurately, on such rich soils, applications of artificial fertiliser to the trees do not result in marked responses in respect of either growth or cropping.

The fundamental problem of fruit tree nutrition is one concerning the growth processes of the tree and, within limits, the yield of tree fruits is correlated with growth; in other words, fruit production is dependent upon wood production.

Fruit trees making either poor growth or excessive growth are usually unproductive, maximum fruitfulness occurring when trees are in a condition of moderate vigour.

These considerations of the relations between growth and fruitfulness may be to some extent illustrated by computations (based on analyses) of the proportions of a tree's annual intake of minerals utilised for wood and shoot growth and for fruit; the major portion of a fruit tree's intake of mineral nutrients is employed in growing, and only a small portion enters into the composition of the fruit crop produced.

With these facts in mind, it should be readily understandable that applications of artificial fertiliser to healthy trees which are making satisfactory annual growth, may not always result in appreciable improvement in yields; further, it is apparent that weak growing, unhealthy trees cannot be expected to produce maximum crops. It is trees of the last mentioned type which will give the most marked response to timely application of suitable artificial fertilisers.

Symptoms of Mineral Deficiencies in Fruit Trees.

From the foregoing, it will be realised that the general appearance of fruit trees —the vigour and nature of their growth —may be expected to give some indication of whether or not they are suffering from the lack of some essential mineral, and that such indication may well serve as a guide to fertiliser practice on individual orchards. In point of fact, by means of pot culture of various types of the fruits, it has been possible to demonstrate very clearly that when certain fruit trees are grown under poor supply of various minerals, they will exhibit specific symptoms as a result of deficiencies of these minerals. Pot culture experiments on apple trees have been in progress for a number of years in both United Kingdom and Australia, and a great deal of information is now available as to the effect of lack of nitrogen, lack of potash, and lack of phosphoric acid on tree growth, and general tree health. Furthermore, in connection with many types of fruit trees, information is becoming available concerning the connection of various other mineral deficiencies with diseases of a previously obscure nature. As instances, one may quote "Leaf Scorch" of apple trees due to deficiency of potash; "internal cork" of apples occurring in New Zealand, and in parts of Tasmania and New South Wales, due to deficiency of the minor element, boron; one further example is the possibility that "Mottle-Leaf" of citrus trees is due to a deficiency of zinc; in parts of South Australia citrus trees so badly affected with mottle-leaf that they were fit only for grubbing have been restored to full vigour and productiveness through application of sprays containing zinc. Trees sprayed in such manner are able to absorb small quantities of zinc through their leaves, and these minute quantities have been sufficient to bring about complete restoration of tree health.

Consideration of symptoms occurring in various plants as a result of deficiency of so-called minor elements, such as boron, zinc, copper, manganese, and so on, is, of course, too extensive a subject to be dealt with in this paper.

It is desirable, however, to make reference to the symptoms exhibited by apple trees when they are suffering from deficiencies of those elements commonly known to be deficient in certain soils and which enter into the composition of the artificial fertilisers of commerce.

Deficiency of Nitrogen.

Deficiency of nitrogen—an element which is supplied by such artificial fertilisers as sulphate of ammonia and nitrate of soda—is by no means uncommon in South Australian orchards. Apple trees suffering from shortage of nitrogen make very restricted growth, the foliage is scanty, individual leaves are small and very pale green, instead of deep green; in autumn, the leaves develop very bright yellow tints, and fall early, defoliation characteristically occurring first at the base of shoots and progressing upwards.

The bark of such nitrogen-deficient trees is usually a pale reddish colour.

Deficiency of Potash.

This deficiency is not so commonly observed in Australia, although several cases of what is thought to be potash deficiency was observed in apple orchards at Light's Pass and in the Verdun district during last growing season.

Under poor supply of potash, growth of trees is not markedly restricted as in the case of nitrogen deficiency, and such trees may appear comparatively normal in the early part of the season. Later in the year, however, a severe scorching of the margins of the leaves may occur, coupled with premature leaf-fall. In contrast to the manner of defoliation of nitrogen-deficient trees, leaves of trees suffering from potash deficiency defoliate progressively from tips of shoots towards the base. Leaf scorch occurring in certain South Australian apple orchards last season was accompanied by very early leaf fall, the affected trees being absolutely bare of leaves towards the end of the season; later still, there occurred a fresh bursting of buds, and some trees even flowered and set fruit in April-May.

Deficiency of Phosphoric Acid.

Lack of sufficient phosphoric acid in pot cultured apple trees results in restricted growth and small narrow dark-green leaves bearing purple colouration at the margin. As in the case of nitrogen deficiency, the leaves develop bright autumn tints and tend to fall very early. Buds burst rather late in spring, and there is a tendency for dying of buds and development of rosettes at shoot terminals.

Symptoms of deficiency of some other elements of plant nutritian have been established and catalogued in the same way as those of nitrogen, phosphoric acid and potash, but I will confine my present remarks to these three latter plant foods which enter the composition of artificial fertilisers commonly in use.

Diagnosis of Mineral Deficiencies as a Guide to Fertiliser Practice in the Orchard.

The procedure adopted by the physician in cases of sickness of human beings is well known to most of us. He tests heart and lungs, determines the body temperature and pulse, and looks for any abnormalities in appearance of the patient which will give a clue to the nature of the sickness, and guide him as to the medicine or diet he will prescribe.

With the establishment of the nature of mineral deficiency symptoms in various types of fruit trees, a similar procedure in diagnosis and prescription of orchard fertiliser treatment is to some extent possible. All orchards do not require the same fertiliser treatment, and a decision as to which fertilisers are to be used should be arrived at after careful observation of the trees, of their condition of growth, and of any abnormalities which they may show.

There is a great deal of evidence that unbalanced manuring of fruit trees may upset them—just as an unbalanced diet will lead to physiological troubles in the human frame.

As an instance, it has been shown in United Kingdom that "leaf scorch"—a symptom of potash deficiency in apple trees is accentuated when low potash goes hand in hand with a liberal supply of nitrogen. Although there is but sparse information available regarding desirable balancing of fertilisers for fruit trees, it would seem desirable to utilise complete fertilisers for routine manuring of deciduous fruit trees which do not show well defined symptoms of deficiency of any particular element. A complete fertiliser known as 2 : 2 : 1 mixture (consisting of two parts of superphosphate, two parts of sulphate of ammonia, and one part of sulphate of potash) is suggested.

Where, however, the appearance of trees suggests definite deficiency of any one element, recourse to applications of a single fertiliser containing the particular element concerned is indicated until such times as trees become more normal in appearance. Observation in the Hills districts of South Australia indicates fairly frequent occurrence of nitrogen deficiency in apple trees, and where trees are showing the typical symptoms of this deficiency, the use of straight sulphate of ammonia at, say, 3lbs. per tree per annum, is suggested until such time as the the trees again attain normal vigour.

The purpose of this paper is not to make specific or even generalised recommendations as to quantities and types of artificial fertilisers to apply to various types of fruit trees, but rather to indicate that arbitrary recipes for manuring of fruit trees can have but little practical value. To utilise artificial fertilisers to the best advantage the fruitgrower must attempt diagnosis of his trees and adjust his fertiliser programme accordingly.

For this reason, and because of the limited time which can be devoted to this paper, I will not harass you with a lengthy list of tentative recommendations which may be quite unsuitable for individual orchards.

Recommendations as to fertiliser programme in any orchard must vary with the conditions of growth, fruitfulness, and general health of the particular trees in question.

Methods and Time of Application of Artificial Fertilisers.

After a decision has been made as to the fertiliser programme best suited to any given collection of trees, there still remains the necessity of applying the selected fertilisers in such a manner and at such a time that the tree can make use of them.

Certain fertilisers, particularly superphosphate and sulphate of potash, do not readily move downward in the soil, and as the main feeding roots of fruit trees are generally situated at some distance below the surface, it is desirable to place fertiliser applications intended for direct utilisation of the trees as deeply as possible. The applications should be ploughed under or placed in deep furrows.

In so far as time of application is concerned, present knowledge suggests that applications should be made prior to growth periods; fruitfulness is closely related to growth reactions, and the major part of absorbed soil nutrients are required for growth Applications to deciduous fruit trees should be made two or three weeks before bud-burst, and in the case of citrus trees, just before each of the two main growth periods in autumn and spring.

Conclusion.

This paper has been designed not so much with the objective of advising fertiliser requirements for all types of fruit crops and all types of orchards, as to stress the complexity of the subject of fruit tree manuring, and the necessity for each individual grower to be a keen observer of the good or bad habits of his trees.

The building up of organic matter by means of routine green manuring is good practice or, in fact, essential practice, on every orchard; the matter of additions of fertiliser aimed at direct supplementing of the mineral diet of trees at any particular period is often less important, but more complex, and for final guidance in this regard it is always best to consult the trees themselves.

Feeding Tests at Parafield Poultry Station.

A new series of feeding tests was commenced at Parafield Poultry Station on the 1st April, 1937. Five tests have been arranged each of 50 White Leghorn pullets. The principal object of these tests is to collect some accurate data concerning the results obtained from the soaked grain method of feeding in different ways, also the production of the birds under the various methods of feeding. The following is a list of the tests that have been arranged:—

A. Morning—Soaked wheat at rate of 8lbs. grain per 100 birds, meat meal ½lb. per 100 birds, greenfeed same quantity as dry grain. Afternoon—Same as morning, but meat meal ¼lb. per 100 birds.

B. Morning—Soaked wheat at rate of 8lbs. per 100 birds, ¼lb. meat meal per 100 birds, ¼lb. linseed meal per 100 birds, greenfeed same as No. 1 test. Afternoon—Same as morning, but without the ¼lb. linseed meal.

C. Morning—Soaked wheat once a day at rate of 8lbs. per 100 birds, meat meal ¾lb. per 100 birds. Afternoon—Dry wheat at rate of 1¼ozs. per bird.

D. Morning—Soaked barley twice a day at rate of 8lbs. per 100 birds, greenfeed same quantity as dry grain, meat meal ¼lb. per 100 birds. Afternoon—Greenfeed same quantity as dry grain, meat meal ¼lb. per 100 birds.

E. Morning—Soaked wheat and barley at rate of 4lbs. wheat and 4lbs. barley per 100 birds, greenfeed same bulk as dry grain, meat meal ½lb. per 100 birds, linseed meal ¼lb. per 100 birds. Afternoon—Dry grain at rate of ¾oz. wheat per bird and ¾oz. barley per bird.

The quantity of food as stated in the test will vary from time to time according to the requirements of the birds. The quantities stated in the tests are given as a basis, but are also liable to alteration according to the requirements af the stock.

Test.	No. Eggs Laid from 1st April, 1937, to 31st August, 1937.	No. Eggs Laid, September, 1937.	Total Eggs Laid from 1st April, 1937, to 30th Sept., 1937.
A	2,903	898	3,801
B	2,639	900	3.539
C	2,579	872	3,451
D	1,985	873	2,858
E	2,361	901	3,262

	Value of Eggs.		Cost of Food.		Return Above Cost of Food for September, 1937.	Total Return Above Cost of Food, 1st April to 30th September, 1937.
	1st April to 31st Aug., 1937.	Sept., 1937.	1st April to 31st Aug., 1937.	Sept., 1937.		
	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.
A	15 8 8	3 13 8	5 13 8	1 2 2	2 11 6	12 6 6
B	13 17 1	3 13 10	5 11 8	1 2 0	2 11 10	10 17 3
C	13 14 2	3 11 6	5 13 8	1 2 2	2 9 4	10 9 10
D	10 7 2	3 11 7	5 14 11	1 3 4	2 8 3	7 0 6
E	12 4 6	3 13 11	5 13 7	1 2 10	2 11 1	9 2 0

Production and Exports.

The production of butter and cheese for August, 1937, was :—Butter, 1,614,820lbs. ; cheese, 1,085,213lbs.

Meat exports (figures taken from statistics supplied by the Australian Meat Board)—

	Total Australian Exports, July-August, 1937.
	Carcasses.
Mutton	85,973 (S. Aus., nil)
Lamb	128,815 (S. Aus., 9,597)
Pigs (porkers and baconers)	38,265 (S. Aus., 191)
	Cwts.
Chilled beef	124,818 (S. Aus., nil)
Frozen beef and veal	540,507 (S. Aus., 311)

Rainfall Table

The following figures, from data supplied by the Commonwealth Meteorological Department, show the rainfall of the subjoined stations for the month and to the end of September, 1937; also the average precipitation for September, and the average annual rainfall.

Station.	For Sept., 1937.	Av'ge. for Sept.	To end Sept., 1937.	Av'ge. Annual Rainfall.
Far North and Upper North.				
Oodnadatta	—	0·29	0·96	4·60
Marree	—	0·43	2·88	5·80
Farina	—	0·46	4·04	6·37
Copley	0·17	0·63	5·08	7·76
Beltana	0·30	0·71	6·52	8·39
Blinman	0·90	1·03	9·75	11·71
Hookina	0·44	0·92	8·74	10·94
Hawker	0·48	1·11	11·71	12·09
Wilson	0·53	1·05	10·76	11·65
Gordon	0·39	0·94	9·77	10·23
Quorn	1·09	1·28	13·96	13·10
Port Augusta	0·59	0·92	9·67	9·40
Bruce	0·54	0·94	11·63	9·74
Hammond	0·80	1·45	10·96	11·05
Wilmington	2·80	1·87	18·75	17·18
Willowie	1·02	1·41	11·33	12·10
Melrose	3·19	2·45	20·24	22·80
Booleroo Centre	1·55	1·66	14·07	15·14
Port Germein	0·94	1·27	11·64	12·51
Wirrabara	2·77	2·14	20·71	19·22
Appila	1·72	1·62	13·88	14·59
Cradock	0·51	0·99	15·28	10·67
Carrieton	1·00	1·17	10·67	12·11
Johnburg	0·64	1·06	12·12	10·49
Eurelia	1·11	1·31	11·66	12·66
Orroroo	1·29	1·24	12·88	13·12
Nackara	0·59	1·14	13·11	11·09
Black Rock	0·85	1·24	10·31	12·26
Oodlawirra	0·63	1·21	11·85	11·34
Peterborough	0·94	1·40	9·55	13·14
Yongala	1·67	1·56	13·30	14·37
North-East.				
Yunta	0·11	0·64	10·86	8·44
Waukaringa	0·16	0·58	8·99	7·82
Mannahill	0·04	0·42	8·93	8·08
Cockburn	—	0·73	8·57	7·81
Broken Hill	0·06	0·78	7·42	9·40
Lower North.				
Port Pirie	1·01	1·37	12·53	13·18
Port Broughton	1·38	1·49	13·55	13·87
Bute	1·89	1·61	14·28	15·42
Laura	2·35	2·12	14·77	17·93
Caltowie	1·76	1·98	13·93	16·69
Jamestown	2·47	2·08	15·99	17·68
Gladstone	2·48	1·91	14·09	16·31
Crystal Brook	2·00	1·72	15·42	15·79
Georgetown	2·85	2·11	14·29	18·24
Narridy	2·89	1·78	16·31	15·74
Red Hill	2·67	1·76	16·72	16·55
Spalding	2·76	2·35	15·01	18·68
Gulnare	2·70	2·21	16·09	18·51
Yacka	3·09	1·74	15·19	15·38
Koolunga	2·55	1·60	13·34	15·29
Snowtown	2·74	1·66	15·55	15·69
Lower North—*continued.*				
Brinkworth	2·42	1·84	15·74	15·72
Blyth	2·61	1·91	16·86	16·73
Clare	4·07	2·84	14·38	24·43
Mintaro	5·50	2·89	24·07	23·30
Watervale	5·69	3·11	26·72	26·69
Auburn	4·03	2·79	20·95	23·92
Hoyleton	2·72	1·93	17·48	17·25
Balaklava	2·31	1·67	16·70	15·41
Port Wakefield	1·66	1·25	14·25	12·93
Terowie	1·66	1·46	12·96	13·27
Whyte-Yarcowie	1·50	1·52	13·07	13·54
Hallett	2·37	1·90	15·80	16·39
Mount Bryan	3·20	2·15	17·37	16·76
Kooringa	3·46	2·06	17·97	17·78
Farrell's Flat	4·00	2·14	19·70	18·52
West of Murray Range.				
Manoora	3·12	2·33	17·60	18·91
Saddleworth	4·05	2·22	20·37	19·56
Marrabel	4·06	2·31	19·84	19·91
Riverton	3·95	2·38	20·27	20·79
Tarlee	3·15	2·09	16·03	18·06
Stockport	2·92	2·01	15·97	17·02
Hamley Bridge	2·16	1·89	14·17	16·52
Kapunda	2·86	2·20	14·76	19·74
Freeling	2·11	1·98	12·15	17·79
Greenock	3·15	2·52	14·99	21·47
Truro	2·54	2·28	14·58	19·75
Stockwell	3·27	2·29	14·70	20·02
Nuriootpa	3·86	2·36	17·43	20·74
Angaston	3·95	2·58	18·26	22·33
Tanunda	4·40	2·49	17·58	21·97
Lyndoch	3·72	2·81	17·80	23·28
Williamstown	3·93	2·94	21·16	27·54
Adelaide Plains				
Owen	3·16	1·89	18·25	14·78
Mallala	1·93	1·81	12·26	16·43
Roseworthy	2·62	1·97	12·89	17·43
Gawler	2·47	2·02	14·76	18·85
Two Wells	1·62	1·57	12·08	15·80
Virginia	1·91	1·76	14·63	17·22
Smithfield	2·35	2·01	16·67	17·68
Salisbury	2·43	1·89	16·38	18·55
Adelaide	2·92	2·08	18·86	21·17
Glen Osmond	3·68	2·74	21·73	25·96
Magill	3·36	2·71	21·84	25·37
Mount Lofty Ranges				
Teatree Gully	3·70	2·96	22·55	27·03
Stirling West	9·14	5·13	41·65	47·01
Uraidla	7·11	8·48	37·31	43·83
Clarendon	4·45	3·51	26·22	32·81
Happy Valley Res.	3·21	—	20·43	—
Morphett Vale	2·86	2·50	20·80	22·62
Noarlunga	3·57	2·24	20·03	20·35
Willunga	4·17	2·80	20·09	25·96
Aldinga	2·52	2·26	17·14	20·21

RAINFALL—*continued.*

Station.	For Sept., 1937.	Av'ge. for Sept.	To end Sept., 1937.	Av'ge. Annual Rainfall.
MOUNT LOFTY RANGES—*continued.*				
Myponga	5·07	3·66	25·33	29·72
Inman Valley	4·48	—	23·31	—
Yankalilla	2·72	2·48	19·01	22·78
Mount Compass	5·68	4·62	25·53	36·25
Mount Pleasant	4·22	3·24	20·23	27·08
Birdwood	4·18	3·38	22·91	29·02
Gumeracha	5·44	3·73	27·54	33·28
Millbrook Reservoir	6·14	4·16	31·26	34·50
Lobethal	6·93	4·19	32·48	35·94
Woodside	6·22	3·87	27·31	32·16
Hahndorf	6·34	4·16	27·08	34·82
Nairne	3·44	3·36	20·56	28·14
Mount Barker	4·74	3·63	23·15	31·24
Echunga	5·01	3·89	26·29	33·30
Macclesfield	3·66	3·74	20·08	30·37
Meadows	5·15	4·35	27·36	36·02
Strathalbyn	2·26	2·23	14·60	19·34
MURRAY FLATS AND VALLEY.				
Meningie	2·42	2·04	13·45	18·29
Milang	1·10	1·54	9·94	14·85
Langhorne's Creek	1·13	1·68	11·03	14·93
Wellington	2·03	1·61	11·53	14·66
Tailem Bend	1·94	1·87	12·21	15·07
Murray Bridge	0·65	1·57	7·52	13·49
Callington	1·03	1·82	8·75	15·14
Mannum	0·53	1·29	9·04	11·49
Palmer	1·41	2·08	12·83	15·63
Sedan	1·18	1·34	10·22	12·01
Swan Reach	0·55	1·30	8·61	10·62
Blanchetown	0·86	0·99	8·56	10·95
Eudunda	3·49	1·92	15·06	17·13
Point Pass	3·38	2·27	17·04	16·66
Sutherlands	2·06	1·20	13·98	10·71
Morgan	0·47	0·97	8·79	9·10
Waikerie	0·23	1·06	7·95	9·59
Overland Corner	0·14	1·10	7·36	10·18
Loxton	0·73	1·36	7·51	11·34
Berri	0·40	1·18	8·28	10·03
Renmark	0·35	1·19	8·62	10·33
WEST OF SPENCER'S GULF.				
Eucla	0·43	0·75	6·09	10·08
Nullarbor	0·41	0·56	4·50	8·87
Fowler's Bay	0·68	0·88	7·66	11·93
Penong	1·23	1·02	9·51	12·28
Koonibba	0·90	1·02	9·69	12·18
Denial Bay	0·94	0·84	9·26	11·33
Ceduna	0·77	0·87	7·18	10·32
Smoky Bay	0·66	0·88	8·29	10·50
Wirrulla	0·80	1·13	11·56	10·87
Streaky Bay	1·68	1·33	12·64	14·91
Chandada	1·23	1·15	11·50	12.66
Minnippa	1·31	1·31	10·85	13·97
Kyancutta	1·56	1·23	9·84	13·45
Talia	1·23	1·60	12·79	14·76
Port Elliston	2·10	1·45	14·80	16·53
Lock	1·81	1·70	12·02	16·44
Mount Hope	2·94	—	19·52	—
Yeelanna	2·46	1·80	13·98	16·11
Cummins	2·41	1·93	15·98	17·70
Port Lincoln	3·15	1·95	14·80	19·35
Tumby	1·40	1·64	8·92	14·29
Ungarra	2·18	2·06	13·06	16·94
Port Neil	1·18	1·52	7·55	13·16
WEST OF SPENCER'S GULF—*continued.*				
Arno Bay	0·84	1·49	8·22	12·83
Rudall	1·02	1·36	10·02	13·23
Cleve	1·38	1·67	10·40	14·96
Cowell	0·46	1·16	6·29	11·06
Miltalie	1·05	1·47	12·33	13·75
Mangalo	1·17	1·54	8·65	13·86
Darke's Peak	2·36	1·76	13·69	15·24
Kimba	1·55	1·19	9·00	11·84
YORKE PENINSULA.				
Wallaroo	1·70	1·32	11·69	13·97
Kadina	1·70	1·54	13·87	15·59
Moonta	1·31	1·40	10·92	15·04
Paskeville	2·58	1·57	13·82	15·44
Maitland	4·22	2·03	17·40	19·86
Ardrossan	3·08	1·49	14·34	13·96
Port Victoria	2·30	1·57	12·90	15·39
Curramulka	2·24	1·91	13·83	17·81
Minlaton	2·19	1·86	13·61	17·72
Port Vincent	1·35	1·77	10·23	14·37
Brentwood	2·10	1·74	15·22	15·61
Stansbury	2·90	1·92	13·53	16·81
Warooka	2·34	1·86	13·60	17·44
Yorketown	2·26	1·87	13·34	16·88
Edithburgh	2·19	1·79	11·75	16·38
SOUTH AND SOUTH-EAST.				
Cape Borda	3·80	2·15	23·75	24·87
Kingscote	2·71	1·86	16·14	19·27
Penneshaw	2·99	2·18	16·65	19·18
Victor Harbour	3·37	2·38	18·80	21·43
Port Elliot	3·02	2·22	16 90	19·94
Goolwa	2·31	1·93	16·15	17·84
Maggea	0·69	1·14	8·37	10·02
Copeville	0·73	1·49	9·64	11·51
Claypans	0·51	1·09	9·81	10·53
Meribah	0·60	1·39	6·97	11·11
Alawoona	0·70	1·09	8·86	10·26
Caliph	0·69	0·80	9·82	10·44
Mindarie	0·90	1·53	9·74	12·13
Sandalwood	1·30	1·61	10·24	13·60
Karoonda	0·92	1·68	9·78	14·18
Pinnaroo	0·91	1·67	7·88	14·19
Parilla	1·04	1·75	9·53	13·64
Lameroo	1·30	2·02	10·04	15·79
Parrakie	1·57	1·84	10·24	14·61
Geranium	1·61	2·02	10·79	16·39
Peake	1·22	1·90	11·80	15·95
Cooke's Plains	1·63	1·82	12·48	15·29
Coomandook	1 37	1·99	11·75	17·03
Coonalpyn	3·31	1·98	14·85	17·65
Tintinara	3·20	2·15	14·47	18·72
Keith	2·71	2·19	14·52	17·96
Bordertown	2·62	2·19	14·59	19·14
Wolseley	3·05	2·21	14·28	18·47
Frances	2·73	2·29	14·10	20·12
Naracoorte	2·81	2·58	16·39	22·65
Penola	3·43	2·79	17·20	25·94
Lucindale	3·92	2·51	21·06	23·47
Kingston	3·25	2·34	16·18	24·24
Robe	5·00	2·20	22·46	24·65
Beachport	4·82	2·36	21·49	27·07
Millicent	5·19	2·96	24·46	29·87
Kalangadoo	3·50	3·47	20·72	32·05
Mount Gambier	3·16	3·08	16·36	30·34

Agricultural Bureau of South Australia

Reports Received from Branches.

The following is a list of Branch Reports received during the month, and shows the date and principal subject of each meeting:—Balumbah, 26th August, discussion. Berri, 6th September, "Fungus Diseases," F. R. Arndt. Blackheath, 26th August, paper from *Journal*. Blewitt Springs, 14th September, "Tobacco Culture," R. E. Giles. Booleroo Centre, 28th August, discussion, "Old Time Wheats"; 24th September, Congress Report. Boor's Plains 2nd September, "Harvesting Machinery," H. B. East. Brimpton Lake, 26th August, discussion, Congress. Brinkley, July, visit by Murray Bridge Branch; 25th August, annual meeting; 22nd September, discussion. Brownlow, 18th August, "Traffic Code," G. H. Biar. Bute, 6th August, address, O. Bowden; 3rd September address, T. H. Trengove. Butler, 30th August, "Sheep," N. G. Stewart. Cambrai, 4th September, "Jetting Sheep," P. H. Kreuger; "Fences," C. Schultz. Carey's Gully, 13th September, visit by Lenswood Branch. Chandada, 9th August, papers, J. Maroney and R. Evans; 28th August, discussion, Conference. Charra, 9th September, re-organisation of Branch. Chilpuddie Rock, 25th August, discussion. Coomandook, 22nd September, "Wool," C. A. Goddard. Coonalpyn, 21st September, Congress Report. Cudlee Creek, 6th September, Inaugural Meeting. Eurelia, 18th August, Conference Reports. Echunga, 22nd September, "Summer Fodders" G. Symes. Gladstone, 27th August, discussion. Glencoe, 7th September, discussion. Goode, 22nd September, "The Bureau," C. P. Linke and C. P. Will; 25th August, address, C. P. Linke. Green Patch, 23rd September, Congress Report. Hartley, 8th September, discussion. Hope Forest, 7th June, "Milk Testing," H. Peters; 5th July, "Wireless," M. Quigley. Ironbank, 25th August, "Cultivation and Manuring," H. H. Orchard. Jamestown, 25th August, Question Box. Karte, 1st and 22nd September, formal. Keyneton, 8th September, report of visit to Roseworthy College. Kingston, 21st August, discussion; 25th September, Congress Report. Kyancutta, 7th September, discussion, Congress. Lenswood and Forest Range, 30th August, "Diet Value of Apples," Dr. Jungfer. Light's Pass, 20th September, Congress Report. Lipson, 25th September, paper, R. Rogers. Lobethal, 19th August, annual meeting. Lyndoch, 20th July, annual meeting; 17th August, discussion. Marama, 22nd September, Congress Report. McLaren Flat, 23rd September, "New Zealand," F. B. Wilson. Millicent, 17th September, paper, D. McCord. Miltalie, 3rd September, Homestead Meeting. Monarto South, 18th September, Congress Report. Mount Bryan, 28th August, discussion, Congress. Mount Gambier, 9th July, annual meeting; 13th August, Question Box. Mount Pleasant, 8th September, "Training the Sheep Dog," F. Staples. Murraytown, 25th September, Congress Report. Narridy, 4th September, address M. Reynolds. O'Loughlin, 19th August, social. Parrakie, 27th August, discussion. Poochera, 7th September, discussion, Conference. Port Elliot, 14th August, discussion. Pygery, 14th September, discussion, "Wool Samples." Riverton, 31st August, "Tilling the Soil," E. Travers. Rosedale, 21st September, "Dairying," J. Mellors. South Kilkerran, 8th September, "Building up the Flock," R. E. Hasting. Stockport, 27th August, annual meeting. Summerfield, 24th August, "Wool," C. A. Goddard; 10th September, discussion. Sutherlands, 3rd September, "Science in Agriculture," E. L. Orchard. Taplan, 28th July, "Wool" C. A. Goddard; 31st August, annual meeting. Taragoro, 19th August, "Farm Engines," L. Smallacombe. Truro, 20th September, "Farm Machinery," F. W. T. Kupke. Upper Wakefield, 26th August, debate, "Machine *v.* Hand Shearing." Wallala, 28th August, discussion, Congress. Warramboo, 2nd September, "Care of Harness," F. Chilman. Weavers, 6th September, discussion. Willowie, 7th September, address, W. E. Lange. Wolseley, 7th August, discussion; 4th September, discussion. Yandiah, 10th September, Impromptu Speeches. Yundi, 8th August, "Vegetable Garden," M. Jacobs; 22nd September, "Potato Growing," H. H. Orchard.

Papers read at Branch Meetings

Fences.

[C. Schultz (Cambrai).]

The most economical and serviceable fence consists of good gum posts 10yds. apart with two wooden droppers between, and with two barb-wires and four plain wires, 3ft. 7ins. high. The bottom wire should be 7ins. from the ground, with the other wires spaced 6ins.—6ins.—6ins.—8ins.—10ins., one barb wire being placed on top and the other one the third from the top. The post holes should be about 2ft. deep and the posts set in as straight a line as possible, being sure to ram the soil tightly around the posts. Strainers should be at least 3ft. in the ground and 3ins. higher than the ordinary posts. These also should be well rammed down, but the most important point is a good stay, which should be 7ft. long, fitted nicely to the strainer 15ins. to 18ins. from the top, with a good iron peg to keep it in position, and a flat stone about 18ins. square sunk in the ground at the bottom end of the stay. A stay thus fitted will keep the strainer in position for years. The boring should be done with a ⅝in. bit, using a larger one for the strainer if possible. After the boring, threading and straining the wiring is soon done.

Costs.—A mile of new fence thus erected would require approximately:—

	£	s.	d.
165 posts @ £7 10s. per 100	12	7	6
10 strainers @ 5s. each .	2	10	0
330 blue gum droppers @ £1 1s. per 100	3	7	6
8cwt. No. 10 galv. wire @ £1 1s. per cwt.	8	8	0
4cwt. No. 14 galv. barb-wire @ £1 11s. per cwt.	6	4	0
	£32	17	0

Labour would cost an additional £13 or £14.

Cyclone Fence.—A Cyclone fence should be more serviceable, although the cost is much greater in the first place. A five-wire Cyclone is quoted at approximately £25 per mile, to which another £3 would have to be added for the extra barb-wire on top, making a total of £28. This is a difference of £10 or £11 in the cost of material, although this figure may be reduced in the time taken in erecting a Cyclone fence.

The main points in fencing are good posts, good strainers, well stayed wires well strained. with the barb-wires securely tied to the posts.

Summer Fodders.

[G. Symes (Echunga).]

Chou Moellier.

Chou Moellier (also known as Giant Narrow Stemmed Kale) is one of the best and most suitable for growing in this district.

Care should be exercised in the selection of seed of Chou Moellier. The best method is to save your seed from specially selected plants. The seed obtained from seedsmen does not always come true to name. and seedsmen do not give any guarantee.

A good method of sowing the seed is to put it in drills, so that they can be weeded. This takes more space, but better plants are obtained on that account. I plant the seed about 10th July. If it is put in too early there is a likelihood of it going to seed in the spring. Give the plants about 6 to 8 weeks in the seedbed, which brings transplanting time to about the middle of September. If a good area is planted with seed, the best plants can be selected, and the weaker ones left, as the strongest plant pays the best. A good method is only to pull twice from the seed bed. The seed bed should be in a sheltered position, well worked up with fresh horse, cow, or fowl manure worked in, and a light dusting of super. The plot to which the plants are to be transferred should be well worked up, fallowed if possible, and with good drainage. In this district, with the heavy rain coming generally in September it is difficult to have a piece of ground well worked and free from weeds.

The only thing to do is to plough the weeds in as green manure, and then harrow down as finely as possible.

In transplanting always work in a handful of super. to each plant. This is better than broadcasting it over the land before working. When the plants have taken and have put on a little growth, give them the first working with a hand plough or horse hoe afterwards hoeing out all weeds between plants. If this is done before the weeds get a good start, there will not be much trouble with them later; the plants will grow and get ahead of them. A good working or two later is generally sufficient to keep things right.

Field Day, Boor's Plains Bureau, 7th October.

If there has not been time, or for some other reason the land has not had a dressing of farm manure previous to planting, a good plan is to mulch each plant after they have been set out, this helps to conserve moisture, and when it rains, washes liquid manure into the roots.

Of course, there are always pests to contend with, whatever kind of crop is grown, and with Chou Morellier there are two which are rather active as soon as the plants start to grow—they are what is known as Riddlers and Blight. The Riddler, as the name implies, riddles the leaves with holes. When you examine the plant if you look underneath the leaf you will find a little green worm about ¼in. in length hanging by a thread. As soon as one goes away the riddler returns to the leaf.

As evidence of these pests, besides the holes in the leaves, one will notice that the heart of the plant looks as if a spider has been trying to spin a web on it. One of the best methods to deal with the riddler, which is a leaf eating pest, is to dust with Arsenate of Lead powder in the heart of the plant, or make a solution of same and spray it on. The Blight is a well-known pest which attacks all members of the Brassica family. It is a sucking insect. The best method of dealing with it is to dust with Nicotine dust or make a solution and spray. Rain will generally keep this in check; they thrive most on fine, warm days.

Millett is a good, early, summer feed, but it is more suitable to warmer climates than ours.

Lucerne is no doubt a splendid summer feed, and if the right soil and some form of irrigation is available it should do well during the warm months.

Amber Cane is something out of the ordinary, but it is very good. One local farmer intends to try it this year. It is very much like sugar cane, and has great fattening qualities; up to 25 tons has been taken from an acre in Victoria.

Maize is a good crop, although not of the early kind. Two cuttings at least can be had from it. It does not like cold winds. It is better suited for cutting than grazing.

Sunflowers are a good crop for cows, and grow well in this district. Last year they grew 9ft. high, with heads 15in. to 18in. across. They are very often sown broadcast, thickly. They do not grow rank and can be cut with a scythe or mower.

Mangels are grown in the summer, but are reckoned to be a winter feed as far as the roots are concerned. However, a good deal of feed can be obtained during the hot weather by plucking the leaves, which are a fine feed for poultry, having very little fibre. I feed the roots also, after grating them up with a coarse grater. I plant the seed with a seeder in drills and thin out later. The lucerne flea is very fond of mangels when they are young, but a dusting of Arsenate of Lead or Paris Green will put a stop to their activities.

Question Box.

At a Question Box meeting held by the Jamestown Branch on 25th August, the following questions were dealt with:—

When is the best time to work lucerne?—Cultivation methods largely depended on time of seeding, *i.e.* Autumn or Spring. The former required little or no attention until ready for cutting; in the latter surviving weeds would be cut with the crop before they seed. New stands were not cultivated in any way and received only a light harrowing before making Spring growth in second year. In cultivating it was desirable to tear up the soil with minimum of damage to plants. For this a narrow rigid-tyne was preferred to penetrate the heaviest soils. Cultivation was best done in July or August before the crop made Spring growth. Cultivation served to aerate the soil, destroy insects, and retain moisture.

Would Federation wheat sown on land not cropped for six years, take flag smut?—If the soil were clean and free of the spores of the disease when sown, the crop would be clean. The spores might be present through the droppings from stock fed on affected hay or chaff; they passed through the alimentary system of the animal without the digestive juices destroying their power of germination, and even if a slight infection occurred, the extra sappy growth of a crop of "Federation," following a six years pasture period, might be inclined to encourage the trouble rather than diminish it.

Methods for destruction of foxes?—Methods suggested were poisoning, trapping, and shooting. Poisoning was most satisfactory and effective. By using a dead lamb or poultry as bait results were better than if meat was used. Baits should be laid in the evening and lifted in the morning to prevent destruction of other animals. In trapping the trap should be buried lightly near the burrow, covered with straw, and meat dragged across to form a trail.

Are patches of no-growth prevalent in crops this year?—Such patches were probably caused by the eel-worm. No such patches had been noticed in wheat crops, although a crop of barley sown on an old lucerne paddock showed very definite signs of "no-growth" patches.

What pasture plants are most suitable for this district?—As a pasture plant lucerne was outstanding. The district was suitable to its growth, and it gave growth practically the year round. The plant lasted from 10 to 12 years before resowing was necessary. Many other pasture plants were unsuitable on account of low summer rainfall.

What is the effect of late pruning of vines?—Experience showed that vines would stand much cutting around. No damage resulted from late pruning, provided it was not left until the shoots were too far advanced; which would cause a loss of sap and consequent weakening. Late pruning caused later ripening of fruit, which would be an advantage where heavy frosts were experienced.

Why do the majority of our sheep go through the season without fly strike, whilst others are struck several times?—Mr. C. L. Hewett had found that once a sheep was struck there was always an attraction for the fly. Sheep with a heavier yoke attracted fly rather than those with a light yoke. Under reasonable conditions and provided the sheep were healthy there was not much danger of fly strike. Wrinkly sheep sweated, which also attracted the fly.

What benefits (if any) are derived from rugging sheep?—Benefits from rugging were noticeable more on the light sandy soils, where rugging eliminated waste by keeping out dust and sand, bringing back wool up to the standard of other parts of the fleece. Clover seed and burr were likewise kept out. Rugged lambs showed the benefit by increased weight and better appearance. Experience showed that the enhanced price of wool did not compensate for the cost of rugs. Although sheep were better in condition, more work was entailed, as sheep had to be yarded frequently to adjust the rugs.

Mount Compass and Inman Valley Branches conducted a Field Day on the property of Mr. M. J. Meyer, "Lincoln Park," Port Elliot, on 30th September.

Tilling the Soil.

[E. Travers, Riverton.]

Ploughing should be done not less than 4 inches deep, and the land should be cultivated to the same depth, except when sowing the seed. Especially when the seed is sown with a combine, seeding should be done as lightly as possible. Seed sown with a seed drill can be sown a little deeper but still not very deep—2in. at the most. Deep tilling is much better for destroying strong weeds and thistles; they do not slip around the wing of the cultivator share, that is when using the wide shares, when you wish to kill weeds. I am prepared to admit that when one cultivates deeply it is difficult to sow light, and, what is more, seed sown at the bottom of shallow tilling will germinate much better than seed half way down or even one-third of the depth of deep work. A crop sown on deep tilling does not usually look as well, or is not as good as crops sown on shallow working in the beginning of the wheat-growing season, and may not look as good a crop at any time of the year, but the deeply worked land usually finishes and yields better. Deep tilling of the land is not enough. After fallowing, the fallow should be gone over again at about the end of August or the beginning of September, while the land is still fairly wet, preferably with a spring-tooth cultivator with very narrow points (2in.) if the land is loose, and ¾in. points if the fallow becomes tough. It is hardly likely that the land will be hard at this time of the year. I prefer the spring-tooth to the harrows, as the spring-tooth with the small points will dig down to the bottom of the fallow. I have a special spring-tooth cultivator for this purpose, well weighted down. The tynes are set 4½in. apart, and it bursts the soil well up between the rows. The fallow should be gone over again in October or November, using a heavy tyne cultivator if the fallow sets at all hard; or if loose enough, the spring tooth is the best, but the land must be loose enough to permit the use of 6in. shares. This is the most important time of the year to cut the land with a share that will not burst the soil, for cutting is far better for destroying weeds and thistles than bursting; and a spring-tooth implement, with 6in. shares, set as near to flat as possible, cuts and pulverises the soil much better than the rigid tyne. I consider harrowing the fallow is best done in the summer months after rain, when the fallow has been well cultivated. Harrowing on top of ploughing or disking is a waste of both time and fuel.

When the first rains in the Autumn set in the spring-tooth should be brought out at once with 2in. points on the tynes. I have never found the land too hard for the spring-tooth at this time of the year, provided that the land is worked as described before. For the next tilling the combine should be brought out with a light harrow behind. After the weeds have got a start, the combine, with its 3½-in. cut should be fitted with 5in. shares. At this tilling with the combine I advocate sowing at least half the super; first to get the super into the land early, so that the land will benefit from the super, especially when one anticipates sowing late. This also saves time during seeding. I have practised it now for six years, and it distributes the super more evenly over the land.

Now is the time to harrow, and harrow as much as one has time for. Sowing the seed and the remaining half of the super is the next operation. If one has to use a combine, two sets of light harrows should be used, one behind the other. It makes the implement pull a good deal heavier but it is profitable. I prefer harrowing separately, but at this time of the year, especially in this wet district, farmers are in a hurry and the weather does not allow time for extra harrowing. In the Riverton district June is the best time to sow wheat or barley. The next treatment of the land, on the now growing crop, should be done in late July and early August, and with sheep. Plenty of sheep on the crop will walk this deep work well down. The wetter the weather the better, and feed it till no green is showing at all. This feeding cannot be done if the land is not clean, for feeding off wheat where the crop is dirty will add vigour to the weeds. Feeding off the crop helps to get rid of many diseases that are in young crops.

Stubble Land for Wheat or Barley.

I sow half fallow and half stubble. This is my fourth year with this method, and so far, I have had very good results. The farm is divided into five equal wheat paddocks, and one fallow and one stubble paddock is cropped each year. The stubble is burnt off the fallow crop in March; it is then tilled and sown with the spring-tooth and combined as described.

Activities of Women's Branches

Forty Eighth Annual Congress

(The proceedings of the Opening Session will be reported in the general report of Congress.)

Attendance of Delegates.

The following Branches appointed delegates, and the figures indicate the number of sessions for which attendances of delegates were recorded:—Alawoona—Mrs. T. M. Jeffery (5), Mrs. F. J. Wright (5); Auburn—Miss Dennison (4), Mrs. J. Tansell (4); Balhannah—Mrs. A. G. Middleton (5), Miss N. Pitt (4); Balumbah—Mrs. A. Ellis (5), Mrs. A. J. Swann (5); Beetaloo Valley—Mrs. J. B. Giddings (3), Mrs. E. A. Pearce (5); Belalie—Mrs. A. J. Symonds (5), Mrs. E. L. Orchard (5); Boor's Plains—Mrs. T. Rodda (1), Mrs. P. Vidal (5); Clare—Mrs. E. Potts (4), Mrs. F. Pink (4); Coonalpyn—Miss E. E. George (5), Miss I. Todd (5); Coonawarra—Mrs. E. G. Allder (5), Miss D. Stafford (5); Devlin's Pound—Mrs. C. R. Smith (5); Echunga—Mrs. G. Edmonds (4), Mrs. G. Porteous (5); Eurelia—Mrs. M. P. Daly (3), Mrs. M. P. Dinon (5); Georgetown—Mrs. J. Bond (5), Mrs. E. Buckenara (5); Gladstone—Mrs. F. C. Spotswood (3), Mrs. W. Ballantyne (5); Hope Forest—Mrs. L. T. Jefferis (5), Mrs. L. G. Osburn (5); Kalangadoo—Mrs. G. Ellison (4), Miss W. Dangerfield (4); Kangarilla—Mrs. J. White (3), Mrs. C. P. Steer (4); Karte—Mrs. Furniss (5), Miss D. Trowbridge (4); Koolunga—Mrs. S. Perrin (3), Miss T. Whitehorn (4); Kybybolite—Mrs. H. L. Miles (5), Mrs. A. R. Rowe (5); Laura Bay—Mrs. F. Edson (4), Mrs. J. Blumson (5); Lobethal—Miss W. Schapel (5), Miss M. Erdmann (5); Maltee—Mrs. C. T. Schwarz (5), Miss L. Schwarz (5); Mangalo—Mrs. A. Turner (4), Mrs. P. Cleave (3); McLaren Flat—Mrs. K. Warren (3), Mrs. A. T. Nicholle (3); Milang—Miss D. E. Hassan (4); Millicent—Mrs. G. Major (4), Mrs. A. Bryant (5); Monarto South—Mrs. F. W. Liebelt (5), Mrs. Martin (5); Morchard—Mrs. B. S. McCallum (4), Miss C. M. Halliday (4); Mudamuckla—Mrs. W. J. Reincke (5), Mrs. D. M. Keitel (5); Mundalla—Mrs. W. J. Dinning (5); Murraminga—Mrs. F. Roberts (5), Mrs. W. R. Kies (3); Narridy—Miss L. Roberts (3), Mrs. M. Reynolds (3); Nelshaby—Mrs. F. Jose (5), Miss T. Franks (4); O'Loughlin—Mrs. E. R. Pfeifer (3), Miss I. Hasting (5); Owen—Mrs. W. J. Marshman (3), Mrs. G. A. Rapko (3); Parilla—Miss L. Carman (4), Miss E. Colwill (5); Parrakie—Mrs. Murdoch (5), Mrs. Hollis (5); Penola—Mrs. W. A. Clifford (4), Mrs. A. H. Reschke (5); Pinbong—Mrs. H. M. Johnson (4), Miss D. M. Scholz (5); Pinnaroo—Miss K. O'Loughlin (4), Mrs. P. N. Dowd (4); Rendelsham—Mrs. L. E. Sly (3), Miss I. M. W. Campbell (5); Saddleworth—Mrs. F. Colman (5), Mrs. G. S. Crawford (4); Sheoak Log—Mrs. V. A. Bowden (5), Miss K. M. Koch (5); Smithville—Mrs. D. F. Day (4), Mrs. S. G. Pillar (3); Snowtown—Mrs. W. T. Pellew (3); Strathalbyn—Mrs. J. W. Collett (5), Mrs. C. M. Hudd (5); Tantanoola—Mrs. J. P. Burchard (5), Miss M. Pycroft (5); Taplan—Mrs. Roy Clarke (5), Mrs. G. F. Schwerdt (5); Warcowie—Mrs. N. W. Crossman (5), Mrs. A. J. Avery (5); Warramboo—Mrs. A. Collins (4), Mrs. O. J. Murphy (4); Wasleys—Miss K. Harding (4); Weepowie—Mrs. J. F. Burns (3), Mrs. M. Ware (4); Wilkawatt—Mrs. P. Thompson (4), Mrs. J. Steer (5); Willowie—Mrs. E. C. Foulis (4), Mrs. A. J. Bartlett (5); Wilmington—Mrs. J. M. Pengilly (5), Mrs. L. J. Cole (5); Wirrabara—Mrs. P. R. Phillis (5), Mrs. E. Harding (5); Yandiah—Miss Rose Keller (4), Mrs. W. C. Jettner (4); Yurgo—Mrs. M. H. Hopgood (5), Mrs. R. M. Rogers (3).

Tuesday, 14th September.

MORNING SESSION.

(Sessions were held in the Women's Nonparty Rooms, Grenfell Street.)

Mrs. E. L. Orchard, of the Belalie Branch, was unanimously elected President of the Congress for the first time. Mrs. J. S. Hammat, of Williamstown, who had acted as Congress President ever since the institution of the Women's Congress was unable to be present this year.

After the roll call, delegates proceeded to the Myer Emporium's "Apollo" dining rooms, where they enjoyed a beauty demonstration by a London expert.

On their return to the Congress rooms, Miss I. Hasting, of O'Loughlin, read the following very comprehensive paper on "Bread making," which aroused a lengthy discussion by delegates, and was appreciated by all.

Bread Making

[*Paper read at the Forty-eighth Congress of the Agricultural Bureau, September, 1937.*]

[Miss I. HASTINGS, O'Loughlin Branch.]

The chief food which the body requires is bread, therefore great care must be taken to make wholesome loaves.

There are many different recipes for making yeast; a good and reliable yeast is generally made with raw potato; only use new potatoes when old ones are unprocurable.

Recipe for Yeast.—¾lb. of peeled potatoes, grate well, add 2 tablespoons sugar, 1 teaspoon salt, and mix together. Boil 2½ pints of water and 1 tablespoon of hops for 15 minutes, then pour over mixture, let cool and bottle. Cork well, keep in a cool place. This should not be used before 48 hours, and will keep for at least 10 days.

The quantity of yeast given in the recipe should be divided into three equal parts, and each portion of yeast put in separate bottles; each amount of yeast is sufficient for 7 2lb. loaves.

When setting the bread thoroughly sift the flour, add 1 handful of salt, 2 tablespoons of lard or good dripping, yeast, and sufficient lukewarm water to mix. The water should be added gradually. When all is mixed together, knead for 10 minutes, but on no account add flour, because this makes the bread heavy.

The dough should be wrapped well in woollen blankets to keep warm, but do not force the bread to rise. It is better for the dough to become quite cold than to get it overheated. If this happens the bread will be spoilt.

When the dough is well risen, knead again, but only for a few minutes, the second rising usually takes 2 to 3 hours, but much depends on the temperature; in cold weather it usually takes a few hours more for each rising.

Moulding Bread.—The bread tins should be slightly greased, and when moulding a loaf no flour should be used, because a good dough will not stick to the hands. When all the dough is moulded in the tins it should be placed in a cool place, and not forced to rise.

While the bread is rising see that the oven is being well heated. When putting the bread into the oven the latter should be left open a little for about 10 minutes to allow for rising before the bread begins to bake. A 2lb. loaf should bake 1 hour and 10 minutes. When the bread is cooked and taken out of the tins it should be well wrapped again to allow the steam to soften the crust.

Wholemeal Bread.—Double the quantity of yeast is required than for white bread, olive oil instead of lard or dripping, and allow 1 dessertspoonful of treacle to each loaf of wholemeal bread. Yeast, salt, olive oil and treacle should be put into the flour, then lukewarm water. Wholemeal bread does not require the same amount of kneading as white bread, and it is more conducive to good health.

Milk Bread.—White flour, a pinch of salt, baking powder, and milk. Allow 1 heaped teaspoon of baking powder to each cup of flour, then add sufficient milk to make a soft dough. Bake a 2lb. loaf for 1 hour. This is a very delicious bread. Milk bread should be mixed with a wooden spoon.

The Aims of the Agricultural Bureau

[*Paper read at the Forty-eighth Congress of the Agricultural Bureau, September,* 1937.]

[Mrs. L. Redman, Millicent Branch.]

When we come to think of a subject for Congress the question is often raised that if only a subject could be suggested, well, then, something might be attempted. So many subjects have been dealt with, and it is difficult to find something new, yet I wonder if we have had any to deal with our own organisation, the Agricultural Bureau.

The meetings are held for the good and mutual help of one another, and this has its results by the members giving from time to time recipes, useful hints, demonstrations, and writing papers.

It has been interesting to have officers from the Education Department to give up an hour of their time to tell the Branch something of their particular work, which is educational for the members. Each local Branch has its part to play, and that can only be done by the members working in harmony, giving of their best in the interest of their Branch, and giving encouragement to those in office, for they are only in office by the member's choice.

For those in office what can be said of them? They are there to learn the rules of the society and do their duty as office bearers. If errors are made, give them time to correct them, for they are sure to learn by their mistakes, and in time master their work and give satisfaction to their Branch without any favouritism. Then we have the aims of our society—a work of mutual benefit, helping one another—and the passing on of the knowledge gained. It may be only in a small way, but it has brought us closer together. It brings our society before the public as one of interest. The social gatherings are another means of joining in with other branches, and breaking down isolation that country life necessarily means. The Congress meetings in Adelaide provide an opportunity for all members of a branch to have their turn to meet other representatives in Adelaide, to learn the work of the Bureau as a whole, and to give delegates a wider knowledge of the organisation.

Curing Beef and a Pig

[*Paper read at the Forty-eighth Congress of the Agricultural Bureau, September,* 1937.]

[Mrs. M. C. George, Coonalpyn Branch.]

Beef.

To cure beef a simple way is to put about 12galls. of water in the pickling cask, ¼lb. of saltpetre, 3lbs. of brown sugar, and enough salt to float a fresh egg. This should corn 150lbs. of beef if packed correctly into the cask.

Before putting the meat into the solution rub it well with dry salt, and bone any ugly pieces. Do not bone the brisket, but joint it, and rub well between the joints with salt. This will make the meat very much sweeter. Done in this way it will be ready to eat in about 7 or 8 days, but should last for a month without the brine going off. If liked, spice can be added to the brine.

Curing Pork.

Take a pig weighing about 120lbs., cut it up, and trim the legs and shoulders for hams, making into nice, round shapes.

The fitches or sides should be rubbed with the following mixture of salt, saltpetre, and sugar:—Take 12lbs. of salt, 8lbs. of sugar, and 1lb. of fine saltpetre (pound the saltpetre to make it fine), mix thoroughly, and then thoroughly rub each ham. This is important.

Put the cheeks, the hocks, and any trimmings from the pig into the pickle with the shoulders, hams, and sides. This will make a brine, and the bacon should be turned at least every other day.

The trotters, cheeks, hocks, and pieces should only take a few days, and should be ready for use at the end of a week. The bacon takes about 3 weeks to cure, then it should be taken out of the brine and dried ready to smoke. The hams take about 4 weeks, but this, of course, will vary according to size. When drained they are ready to smoke. After smoking, which should be done with sawdust, tie up in calico bags, and keep in a cool place. When there are hungry men about for breakfast home-cured bacon will not keep very long.

At the conclusion of the discussion on "Curing Beef and a Pig," Mrs. F. Coleman, of Saddleworth, brought the question of a "Summer School" up for discussion, and said that she, as one of the disappointed delegates, very much regretted the lack of support that was given to this very excellent proposition. She urged delegates to give the matter their earnest consideration in future, and to do their utmost to impress on members of their respective Branches all the enjoyment and benefit such a school would be. Miss Campbell then described to delegates all that had done in anticipation of the Summer School for 1937, and at the conclusion of her detailed talk, Congress carried a motion, "That every Branch consider the question of a Summer School at its October meeting, and forward a report to the General Secretary as early as possible."

Tuesday, 14th September.

AFTERNOON SESSION.

Mrs. Sykes, of the Strathalbyn Branch, read her views on "The Value of Music in the Home", and at the conclusion of the paper numerous delegates agreed that it was one of the best papers that they had ever heard. It was as follows:—

Value of Music in the Home

[*Paper read at the Forty-eighth Congress of the Agricultural Bureau, September,* 1937.]

[Mrs. S. Sykes, Strathalbyn Branch.]

There are few who have not felt the charms of music, and acknowledged its expressions to be intelligible to the heart. It is a language of delightful sensations. We feel plainly that music touches and gently agitates the agreeable and sublime passions, that it wraps us in melancholy, and elevates in joy, melts us in tenderness.

The first music known to human beings is the soft crooning of the mother as she sings her babe to sleep. Good music played in the home is an inspiration to all children; they learn to love the sweet sounds at an early age. Who can listen unfeelingly to the singing of a child? There is no greater influence for good in the home than music.

Every devoted mother who teaches songs to her children knows what memories those songs through by-gone associations arouse in her heart. She knows, too, that her own little ones will remember those same songs long after she is gone. Music is one of the greatest factors in the life of a child.

Children are sensitive and impressionable; the songs they sing foster themselves unalterably in memory. And from the very start the right kind of music should be given to them, as it forms a strong influence in the shaping of character.

There are many beautiful national songs and folk songs of the British Empire that teach the love of home and country, many of them charming in melody, full of gentle tenderness in words as well as music.

There is room for a good song in every day, and in every labour, and it is astonishing what a difference it makes to the heart in its effort to master the words. There are many who never hear the sweet music of eloquence, or who never listen to it in the way to catch its melody, but everybody will listen to a song, and the more simple the stronger hold it has upon us; for simple words have the strongest claim upon our attention. There is no solitude in music. We are surrounded by the most beautiful and entrancing spirits to which we are subject, for a song is sweeter when voiced by those we love, as it is the more familiar form of love's expression. Good homely natural songs never die nor grow old, and we live over again our youthful days as we sing them, or hear them sung.

A happy family sing-song of well-known tunes or hymns helps to put all in a good mood, and create a pleasant and cheerful atmosphere. It is impossible to feel out of tune with everything when there is a song in the heart. A singing world is a happy world. Many a painful human experience is softened by the singing of a little ditty; many a toil brought within our measure by its innocent charm. Music appears to be a rejuvenator, whose quickening impulse is felt, not only in the mind and emotion, but even in "this too, too solid flesh." It has the cleansing and tonic properties of a warm bath. It calms while it invigorates; it eliminates the toxin of care; quickens and clarifies the stream of thought, and opens the breathing pores of the soul to a larger life. A musical evening in the home. How often do we hear of one to-day? The Great Masters of olden days often met together in the quietness of the home and performed their compositions before each other. Their true love and sympathy for each other, and for their art, were the means of helping and inspiring one another to yet more glorious thoughts and achievements.

ENCOURAGEMENT FOR THE BEGINNER.

The home is the place where all young people commence their musical life, whether as instrumentalists or soloists, and the parents and friends at home are often called upon to take the place of an audience. A few kind words of encouragement to these young performers will go a long way towards successful performances later. Music is the youngest of all the arts. Painting and sculpture were practised long before music began to develop. The basis of all music and the very first steps in musical development are to be found in the musical utterances of the most undeveloped and unconscious types of humanity. Through the study of the ways in which they contrive their primitive fragments of tune and rhythm, and the principles upon which they string these together, the first steps of musical development may be traced.

FOLK MUSIC.

Folk music begins a step higher, when these fragments of tune are strung together upon any principle which gives an appearance of orderliness and completeness. As the standard of human organisationtion improves, the capacity to balance things more regularly becomes evident, the power to alternate simple figures more systematically immediately produces a tune of primitive type of a more definite character. True folk music is an outcome of the whole man, as is the case with all that is really valuable as art. The features which give it its chief artistic and historical importance, are those which manifest the working of the perfectly unconscious instinct for design, and those in which the emotional and intellectual bases of the art are illustrated by the qualities of the tunes which correspond with the known character of the nations and people who invent them.

Folk tunes are the first essays made by man in distributing his notes to express his feelings in terms of design. A large proportion of the tunes came into existence in connection with poems and ballads, which told some story or tragic event of local interest. All the older nations have their folk tunes. Different counties and different villages and homes having their own particular folk songs. These folk tunes have been sung in the homes and handed down from one generation to the other. Many of these beautiful tunes that have been made in the home are known to us. Irish folk music—probably the most human, most poetical, and most imaginative in the world—is particularly rich in tunes, which imply considerable sympathetic sensitiveness.

A good example is the well-known "Londonderry Air," often wrongly called "Danny Boy." We have all felt the rich beauty and highly emotional design of this tune, and as a simple emotional type it is one of the most perfect in existence. As art music grows and pervades the world, pure folk music tends to go out of use among the people, they cease to make their own tunes. During recent years efforts have been made to preserve these folk tunes, and many beautiful tunes have been published for the use of all people. In England, and also in Australia, there are folk song societies for the purpose of studying these rich melodies handed down through the ages by the homely people of all nations.

THE GRAMOPHONE.

A good gramophone in a home is a valuable instrument in many ways. It is a great aid to musical education, especially to those who live in the country, and long to hear good concerts of the best music. Children who listen to good music played on the gramophone develop a taste for the best singing and instrumental music.

Many beautiful voices, now silent, are heard again in all their loveliness and beauty. Besides vocal music on the gramophone we are permitted to hear works that could not be performed in the average home. These are the many trios and quartets for stringed instruments, and this is known as "Chamber Music." Chamber music is like the conversation of intimate friends, each part is of equal importance. Chamber music is also written for wood-wind instruments—flutes, horns, oboes, claronets, and bassoons—and if listened to intently and intelligently it is possible to recognise the various instruments as they in turn may be heard. The listener is able to identify each instrument represented, and the various and rich tone colours. The hearing of oratorio music in the home is made possible by the gramophone. It is usually in large cities where magnificent choral works such as Handel's "Messiah," Bach's "St. Matthew's Passion," Mendelssohn's "Elijah," "St. Paul," and others are performed. Lack of voices and instrumentalists in the country make it impossible to produce such glorious music, but again the gramophone can give us the pleasure of hearing this wonderful and uplifting music.

It is possible to hear music on the gramophone many times over, it never gets tired, and our favourite music may be heard whenever we wish to hear it. There are many branches of music not mentioned that may be heard on the gramophone. It is now a beautiful musical instrument, which can help us all, however talented we are, and give us great and lasting pleasure.

THE RADIO.

We realise to-day that the chief value of broadcast performances is to widen the musical horizon of people in districts and lands remote from good first-hand performances of serious music. Radio links together every hearth and home. Many invalids have had their lives made brighter by the addition of wireless to the home. They are not able to travel or visit places of musical interest, and have had to forego the pleasure of hearing all music, other than what can be performed in the home. Beautiful and magnificent choral and orchestral music that is heard in the home over the wireless would never be heard at all by many people if it were not for this wonderful invention. In country towns and outback districts it is not possible to hear this music otherwise, because there is not sufficient talent, either vocal or instrumental to perform some of the glorious compositions that are rendered in our cities every year. Listening to good wireless music, especially orchestral music, is educative. It helps people to listen attentively and intellectually for the various tone colours of the instruments employed, thus giving them a knowledge of each instrument and recognising them in their turn.

With the radio in the home, it is also possible to hear the great artists of the world, singers and instrumentalists, who are travelling from country to country. Not all people are permitted to journey to the city and hear these artists, but with the wireless in the home, many happy and inspiring evenings are spent, listening to the beautiful strains of music and song.

NATURE'S MUSIC.

There are many beautiful notes of melody and sweet musical sounds of Nature that can be heard by us all, around and within our homes. The happy songs of birds in the garden, the gentle rustling of trees in the breeze, the quiet murmuring of bees as they move among the flowers. There are many sweet sounds if we pause to listen when walking in our garden.

Those who live near the sea may hear the majestic roll of the ocean, like the deep tones of an organ, or again, where pine trees grow near the home, what a sweet murmur they make?

These are all a part of the great orchestra of the Universe, and belong to us all if we will only listen. The Universe is one vast harpsichord, tuned to some grand psalmody that sings its madrigals, its pastorals, its psalms, and it songs. The world is full of music and melody, and it is ours to take and enjoy and love, whether by instrument or voice, or listening to the beautiful and ever-changing music of Nature.

Delegates were very interested in Mrs. W. H. Lewis's talk on "How to Conduct a Meeting", and they all agreed that they would do their best to see that their individual Branch meetings were conducted somewhat on the same lines as Mrs. Lewis suggested. Among her remarks she said that the two most important persons at a meeting were the Chairman and the Secretary. Of the two, the Secretary had more to do than the Chairman. Preliminary arrangements for the meeting had to be made, the agenda prepared, minutes taken down and written up, correspondence attended to, and the wishes of the meeting carried out as expressed during the business session. On the other hand, although the Secretary might have done her part, an inefficient Chairman could ruin the meeting, and therefore the positions might be compared with the mechanic and the pilot of an aeroplane. Both must be efficient in their respective jobs to ensure success. If the mechanic did his job and the pilot failed, even perfect weather could not ensure safety. In the same way, although the Secretary might have made all the necessary preparation and spared no detail, her job might be a failure.

The common form of address to the chair is "Madam Chairman". Sometimes this person was referred to as "Chairman", as it was not quite clear to everybody's mind just what was the proper form of address. Recently, authorities had laid it down that there was no reason why a woman should be called a Chairwoman any more than a female Bachelor of Arts should be called Spinster of Arts, or a female doctor a Doctress. All were titles, and it did not matter whether a woman or man occupied the position.

THE SECRETARY.

One of the most important qualities of a good Secretary was tireless energy. The Secretary must be prepared to devote herself to the work for the work's sake, whenever she was called upon to do so. Her work was practically unending. As soon as an Association was formed and the Secretary appointed, her work began. Notes of the first meeting must be recorded, she must prepare the minutes, which were really a brief report of what happened at the meeting, attend to the correspondence, file it in order for presentation to the next meeting; see that everything was in order, that the building in which the meeting was to be held was quite clearly explained to those concerned, that the papers necessary were in order, and then prepare the agenda for the forthcoming meeting.

THE AGENDA.

The word "agenda" means "things to be done" and is merely a programme setting out the things to be considered at the meeting. The agenda should be gone through by the Chairman and the Secretary. The agenda itself should be set out on one side of the paper, leaving the other side for remarks on each item. At the meeting the Secretary should first present apologies received. An apology was merely an act of courtesy on the part of a person who found it impossible to attend the meeting, and a note was made in the minutes that this act of courtesy had been performed. After the Secretary had noted the names of those present and apologies received, the minutes of the last meeting were read and confirmed.

THE MINUTES.

The minutes were compiled from the remarks put by the Secretary. In the blank column on the right-hand side of the agenda paper. They included:—Present (names of those present, beginning with the Chairman), Apologies (names of apologies received), "Minutes of previous meeting were read and confirmed", Business arising from minutes of previous meeting. For this last item the Secretary reported what she had done regarding the matters considered at the last meeting, and any information secured. Correspondence received and action regarding same was dealt with, and instructions given to the Secretary as a result of that correspondence were recorded.

Under the heading, "Any other business", were recorded any suggestions or plans proposed to be carried out, such as an address by a visiting speaker, or some open matter.

If there was a visiting speaker, the formal business could be completed early. After the speaker had given her address, a vote of thanks should be extended, and the meeting closed. After the meeting the Secretary went through new correspondence, instructions and wrote up minutes, keeping a record of everything important. When a motion was brought forward, there was usually a fairly lengthy discussion not of much recording value. The Secretary made a note of all what was said, and then went through it afterwards and sifted out the useful points.

THE CHAIRMAN.

During the progress of the meeting, the Chairman was in complete control. The chair was a symbol of authority, and respect should be paid to it. In the meeting, the Chair should be addressed by every remark. If necessary, the Chairman should call order immediately. When one wished to put forward a question, suggestion, or speak on any matter, one should stand and address the Chairman. Everything must go through the Chair.

A matter to come up for discussion should first be moved and seconded in due form before the Chairman allowed any discussion on it whatever. A motion must not be interrupted. The matter was not open for discussion until the motion had been moved and seconded. The Chairman then stated that the motion was open for discussion. It was wise for the Chairman to say, before she threw the matter open for discussion, "I can only allow each speaker to speak once on the subject". Then no member of the audience could speak more than once to the same motion. The Chairman was at the controls, as was the pilot of an aeroplane, and she must see that the meeting was conducted strictly according to rules.

The four essentials for a perfect Chairman were:—(1) Firmness, (2) Impartiality. (Should she wish to state personal views on a matter, she should ask a member of the audience to take the Chair in her stead, in which case she stated her views as "Mrs. Brown" and *not* as Chairman). (3) Tact—Should any member decide to deviate from the subject, the Chairman should call her attention to the fact that "so-and-so" was being discussed, and ask that if she would be good enough to save her matter until a little later, the meeting would be pleased to hear it. Tact was essential. (4) The Chairman should have a thorough knowledge of the duties of her position and rules governing the conduct of a meeting.

Motions and Amendments.

A motion must be formally moved and seconded before discussion. Anybody could move an amendment, but the Chairman would not accept an amendment which was a direct opposite of the motion, because the discussion would be limited to that concerning the motion, and would merely be a repetition of the former with the voting reversed. To vote against a motion was equivalent to moving an amendment which was the direct opposite. However, the Chairman would accept an amendment which altered the motion to improve it. An amendment professed to improve the original motion, and if the improvement was accepted, it was natural to vote on the amendment first before the original motion.

If a Secretary was unable to attend a meeting, the Chairman should have the necessary papers, and a temporary Secretary could be appointed to take notes and furnish minutes.

The rescinding of a motion was a very unusual happening, but it could be carried out. A meeting might be held and decide to take a certain course of action and later it might be found that it was impossible to take that action. The motion previously carried therefore must be rescinded. The matter came up for discussion, and the person introducing it moved that the resolution be rescinded.

A very useful book, called "A Guide to the Chairman and Secretary", was obtainable at a price of about 3s.

Delegates then visited the millinery and mantle workrooms of J. W. Richmond Ltd., Gawler Place, and were very interested to see the methods adopted in the making of the different articles on view.

Wednesday, 15th September.

MORNING SESSION.

Living up to Standard and Harmony in the Home

[*Paper read at the Forty-eighth Congress of the Agricultural Bureau, September,* 1937.]

[Mrs. M. A. Jeffrey, Clare Branch.]

While writing this address for mothers on "Living up to Standard," I am thinking of the children in the primary school who are studying so earnestly for their Qualifying Examination. Its aim is to give the children a foundation in education, in all those subjects most important in establishing them in the walks of life they or their parents choose.

The curriculum has been studied and planned by the highest educational experts of the day, and money has been spent freely in developing it. Its teachers have a thorough training, and everything possible is done to make the assimilation of knowledge as pleasant and as easy as can be conveniently carried out without sacrificing common sense and discipline. So we mothers must take advantage of everything that will help us.

Mothers need training in the things that make good mothers. Fortunately Nature has been wonderfully kind in ordaining that love in an almost limitless degree comes with the baby. The unceasing care that a baby needs is often quite cheerfully carried out by the most frivolous and shallow woman, and if they make mistakes it is quite likely to be through over-care rather than under.

Associations like the Agricultural Bureau, when there is an interchange of thought on the problems of the school-going child, must certainly be a great help. We have to keep our eyes open for everything that will help us to be successful in this most important role we have to play. There is a wonderful number of things developed to help us, during, say, the last 10 years; the literature or baby welfare is very easily procured and understood, and health centres and baby health trains lend a helping hand. I can see now the mistakes I made with my babies, but in those days we were more content or inclined to do as mother did.

But the health and feeding of our families is only part of our work; the influence we have on the home and family life is so very important, the responsibility is enormous when we think we are responsible for the children being in the world, the children have no choice, they are helpless. If we parents take the responsibility of founding a family, the responsibility is far more ours than theirs. Let us have a definite ideal or purpose, that we will be the best women our husbands and children meet, we will not let circumstances override us, we will keep on top.

How many times do we become physically weary, discouragement and depression seem to sap our strength and pleasure in living and threatens to overwhelm us?

PRACTICAL SUGGESTIONS THAT HELP TO KEEP A WOMAN FRESH AND LESS FATIGUED.

We will begin with shoes. It is quite customary for us to wear our street shoes or slippers while we are working. I have found it worth while to buy a new pair for mornings—a light sports shoe with special attention to the heel, not too low, but big, after the same shape as on a man's shoe. The support to the ankle is a great help, also if advancing years and extra weight have to be considered, the matron's shoe made on a special last is a great improvement; also when feeling jaded, take a few minutes off and eat a little fruit, sit in the most comfortable chair wherever it is, and "renew your strength and regain composure." We must do all in our power to keep well.

Then sometimes we get what is commonly called "fed up," and longingly think of a holiday or change, if only for a week, we say. Now, what about this scheme, a holiday in your own home. Perhaps allow eight days, starting on Monday morning; imagine a mother with some children, say, two, three, or four and limited means. We all know what it means to have to plan our finances, a holiday away from home is impossible, it would cost at least £5; well, it cannot be done just now, so allow £1, do not try to do it on nothing. Buy in tin foods, cheese, biscuits, cook a large joint to start with, and do not do washing, ironing, or floors that week; let the children have as many picnic meals as possible, somewhere away from you, and do not trouble about their manners and clothes too much, they will not hurt for one week, get some favourite novels to read, and do fancy work or knitting in a leisurely fashion.

Several people have found the book entitled "Rose-Garden Husband" entertaining for one book during this holiday. Explain the plan to your people, I am sure they will help you make the experiment a success; one more important thing, do not try to do the washing on the first Monday you return to your work, have help for that one day.

Mother love is an inspiration to us to do the best and utmost for our children. The children while they are at school have the inspiration of attainment and excelling, and eventually securing their Q.C. and so fitting themselves to take up life. Mothers have to make use of this powerful inspiration to do the most difficult things. It is part of our training to take our Q.C. as successful mothers. Perhaps a little child has a difficult disposition or naughty, troublesome habit, we feel that we must put in time and will power correcting that habit; it would be much easier to overlook it and trust to the little one growing out of it, but we are convinced it is not good to let it go, and so choose the harder part.

Perhaps an older son or daughter is making unsuitable friends or doing something that will injure their good name, or breaking some law of convention that is necessary to youth. It is very hard for a parent to hurt a child's feelings, deliberately to dash the light of pleasure from the eyes, even for a minute, but it must be done at times.

Or your child or husband is sick and very ill, perhaps. The doctor tells you the patient must be kept as cheerful and placid as possible, and that when you go into the room you must be serene and smiling, and allow no anxiety or concern to show on your face; this calls for courage and will power, and is a very difficult test for us to pass. If we are living up to standard the happenings of life are our training, and call for all the endurance and intelligence we can command.

We have talked of inspiration, will power, love, duty, clothes, food, and holidays. I think an intelligent observation of nature and some comprehension of its laws and seasons is of great interest and help. Take a little time to oneself and contemplate the miracle of the "Evening Star," and feel the thrill of this time of the year, "When Spring unlocks the flowers to paint the laughing soil". Let our minds be uplifted with noble thoughts, let us say splendid things, act charmingly, and in the severe crises of life show a dauntless courage, and so pass on a wonderful heritage to our children.

Part II.

HARMONY IN THE HOME.

Supposing we have earnestly tried to attain a definite standard of living as mothers, there is another attainment which I think is very important, that is "Harmony in the home."

I would like to use an analogy or parable to illustrate my meaning. Whilst listening to this address, I want you to picture or imagine you are listening to an orchestra rendering some item of perfectly balanced harmony. Perhaps 20 performers are on the stage before us. The conductor with his baton superimposing his personality and his conception of the composer's idea or theme that has been written in music. When we think of the skill, knowledge, and patient teaching, also the hours of intelligent practice which are necessary to produce a perfect rendering of some such performance of which we are thinking, we realise the earnestness and honesty of purpose that has been put into this work. A well-balanced harmony is the aim or object of an orchestral performance, so the spirit of harmony is to be desired above all else in the home to make it a happy one.

In this case it is to a large extent the mother who wields the baton; the conductor of an orchestra has a knowledge and understanding of his performers, music, and instruments. He knows what they are capable of, and what disabilities they have to contend with; sometimes it means the cutting down, so to speak, of his own ambition to suit the limitations of these players. So a mother knows her family.

Take the husband first. Husbands are like the weather, they cannot be altered much, we must live with them as they are. In many cases husband and wife have attained adult age before they meet, so both have an established disposition and manner which is really theirs, so the best we can do is to adapt ourselves in the nicest way we know, as in winter we put on woollen clothes to keep us warm, and cotton or silk in summer to allow us to be cool, so we must try to adjust ourselves to life with intelligence as well as affection. And as clothes are a protection from the weather, so we must learn to protect ourselves against the pinpricks and monotonous routine of family life. We must not allow little things to worry us too much, as the modern phrase goes, "get on our nerves"; a pleasant hobby or interest of some kind, something that soothes us, such as growing flowers, knitting, reading, outdoor games, and we must not feel we are wasting time when we do these things. We owe it to ourselves to do something that will rest us and build us up, we cannot always be giving out.

OUR CHILDREN.

As the instruments in an orchestra are different, so are they, and they have their own part to create that harmony in the home that no one else can give; the mother has to watch, guide, tone down the stronger, try to strengthen the weaker. Mother love is a gift, a gift that is a wonderful help and inspiration in trying to keep this harmonious spirit living against all odds. A conductor of an orchestra often has the gift of a musical perception of how a piece of music should be played, but not the ability to play the instrument himself; the same with the children, the mother knows what the child should do, but the child must do it himself, he must express himself, we cannot live life for our children any more than a conductor can play all the instruments in the orchestra.

Sometimes children have greater advantages than we had in education and circumstances, and if a spirit of superiority on their part develops, it becomes very difficult to live in harmony one with another: but keep calm, retain a dignity that your position warrants; spirit is greater than any material thing, wait for the phase to pass, as it will in time. I have noticed many times going through life, that the things that worry us are not as wrong and out of place as they appear. Family life alters with the years, as it is in moving from one stage to another that misunderstanding and difficulties seem to develop.

To achieve a perfect harmony there must be understanding and co-operation between performers and conductor in an orchestra, and amongst the members of the family the analogy holds good here. We must try to cultivate a benevolent tolerance for the younger generation and try to get their viewpoint on life before we judge them; and one more point; as the conductor takes the applause in a successful performance and "horrid thought," should there be a failure blame is often piled on him, so in a large measure in the home, praise is meted out to the mother of a well-behaved family, and if the children grow to manhood and womanhood ill-equipped to make their way and fight life's battles, the world is quite ready to blame their training; so let us most earnestly try to be among those mothers whose children "rise up and call them blessed".

Hints on Cake Making

[Paper read at the Forty-eighth Congress of the Agricultural Bureau, September, 1937.]

[Mrs. C. P. STEER, Kangarilla Branch.]

When making cakes it is most important to have everything you require ready to hand before mixing is commenced. Follow the recipes carefully, and be exact in all details. If scales are not available, the following measures will be found useful:—

1oz. flour or soft sugar equals 1 heaped tablespoon.

1oz. rice or currants equals 1 level tablespoon.

1oz. of sugar equals 5 medium-sized lumps.

2ozs. breadcrumbs equals 1 tea cup.

1oz. butter or lard equals 1 level dessertspoon.

1 tea cup jam or sugar equals ½lb.

1 small tea cup of liquid equals ¼ pint.

PREPARING THE INGREDIENTS.

Prepare all ingredients first. A cake may be spoilt if delay is caused by having to wait to blanch almonds or slice peel in the middle of mixing. Always use the best ingredients. Sift flour and baking powder or other rising. This may be done several times to free it from lumps and to thoroughly mix. See that the sugar is free from lumps. Remove the sugar, and slice the candied peel—do not chop it—it looks nicer and goes further when sliced. Stone raisins, and cut them in halves. Clean sultanas and currants. Wash all fruit, shake in a colander, rub in a clean cloth, and finish drying in a cool oven, or the fruit may be cleaned by rubbing it in a cloth with a spoonful of dry flour—rub very hard, then carefully lift the fruit out and free it from flour as much as possible. Blanch almonds and slice them.

When orange or lemon rind is used for flavouring it must be finely grated or rubbed off on a piece of lump sugar, which is afterwards crushed to a powder. Care must be taken to only grate or rub off the yellow part of the rind, because the white is bitter.

When butter is to be beaten to a cream a warm bowl may be used in very cold weather, but it must not be hot enough to oil the butter or the flavour will be spoilt. Beat eggs in a wet basin then they will leave the basin clean, and none will be wasted. Eggs go farther if the yolks and whites are beaten separately. A good pinch of salt mixed with flour is an improvement, for it brings out the flavour of the other ingredients.

When making large fruit cakes always prepare and mix all fruit and spices in a bowl, and leave covered all night. Grease all tins well by using liquid fat that is free from salt and brushing over every part, or line the tins with well-greased paper. Have the paper 1½in. to 2in. above the edge of tin. Most cakes need a hot oven to start with, and then a moderate and decreasing heat until cooked through. Do not open the oven door more than is necessary while the cakes are cooking, and never shut the door with a bang. When cakes contain baking powder or carbonate of soda put them in the oven as soon as they are mixed. Otherwise, if they are kept waiting, the effect of the baking powder works off, and the cakes will not rise. To test when a cake is done, insert a clean, bright, warm skewer in the centre; if it comes out clean and dry the cake is cooked. Turn cake carefully on to a sieve or wire tray, remove paper, and leave until cold. Do not stand a hot cake in a draught. Then keep in an airtight tin.

THE ICING.

Plain cakes can be made most attractive by icing. For this purpose an icing syringe is very useful, and with a little practice very decorative cake can be turned out. Plain biscuits with each child's name iced on top make attractive place-cards for a child's party, and what is more important to the small folk, they can be eaten when the party starts. Coloured icing, nonpariels, coloured coconut—all help to give the cakes a festive appearance.

Helping the Education of the Young Child

[Paper read at the Forty-eighth Congress of the Agricultural Bureau, September, 1937.]

[Miss W. DANGERFIELD, Kalangadoo BRANCH.]

The problem of education for the outback child has ben considerably relieved by the splendid work of the Correspondence School. This branch of our Education Department has helped to send the advantages of our modern education system, with its accompanying happiness, into the most isolated parts of the State.

As "Education is the preparation for complete living," it is our duty to give the child the best opportunities to help him build his character on a firm foundation. In order that these may be complete, it is necessary that the environment be congenial to the child, providing stimulus for the highest development mentally, morally, and physically.

Every young child is happy when at play. Play, when it is intelligent, active, and resourceful, is an education in itself, but when directed by parent or teacher has more possibilities for greater value in training, in self-reliance, fair play, concentration, and accuracy.

In Kindergarten schools and lower grades of larger country schools the child has the advantage of using various properties. By touching, seeing, feeling, and handling the properties at his disposal the child is training the senses, and exercising his intelligence. At the same time, he is learning facts in such a way that they become indelibly impressed upon his mind, thereby cultivating the faculty of memory.

The word "discipline" properly denotes the whole influence, physical, intellectual, and moral, to which a pupil is subjected in the course of education. In the narrower sense, discipline is not only a large part of moral education. but has a very important bearing on intellectual progress. The motives it encourages are being constantly encountered. They are appealed to in every lesson. The teacher must determine, then, which are the motives proper to be encouraged, and how they are to be practically appealed to.

The highest motive which a man can follow is a sense of duty, but to a child, this motive is a very abstract one, and until it comes to be felt as a motive, there are three others, all pure and powerful, by which the teacher must work. They are:—

1. Love of activity.
2. Love for the teacher who directs that activity.
3. The sympathy of the school.

Regarding the love of activity: It is well known that all children are keenly desirous of action, and are very unhappy when anything interferes with it. Provided, then, the work in which he is engaged is suited to his capacity and is made interesting, the child requires no external stimulus, he will give himself to work for its own sake.

Regarding love for the teacher: We know that love is the first and strongest feeling in a child's bosom—love for his parents, love for the teacher who acts towards him in a paternal spirit. This love is essential to his happiness, and it will flow forth from the child unless it is positively repressed by the imprudent or unkind conduct of his superior (parent or teacher). This love will lead the child to self-denial; it will make pleasant for him a patch which may have no attractions in itself. There is but one way to draw forth this love: the teacher must himself feel it and show it towards the child.

Regarding the sympathy of the school: A good social relation is necessary to a child's happiness. He cannot stand alone, isolated and independent. He is swayed by the opinions and influenced by the assemblage of which he forms one. When he is singled out and exhibited as breaking the laws which the whole school recognises as just, and according to which all act, he is pained, and often overwhelmed. No child is so strong as to be able to resist this. Few indeed, so bold as to be disposed to try resistance.

To a teacher who wishes to have a complete command over his children and to rule them by his influence and not by fear, three things are necessary:—

1. He must make the work interesting; not a task, but a pleasure.
2. He must love the children over whom he is placed.
3. He must establish a community of sentiment over the entire school.

REWARDS AND PUNISHMENTS IN THE SCHOOL ROOM.

Rewards and punishments are the natural sanctions of the law. Wrongdoing by adults is punished by law, therefore the same applies in the school room. This punishment does not necesasrily mean the infliction of bodily pain. If the work is made interesting to the pupils, then it is a mark of the teacher's reward that he allows anyone to take part in it. If a mutual love exists between the teacher and the pupil, then the expression of his pleasure is a reward to the child—his displeasure a punishment.

Corporal punishment is at times necessary, but should not be of daily occurrence. When the parent delegates his child's education to the teacher, he delegates, by the same act, all those powers of government by which the parent finds it necessary to govern his child; therefore the act of corporal punishment is sometimes necessary when the laws of the school have been broken.

Summing up, then, one might say that the fundamental points underlying discipline in the school room are:—

1. Make the work interesting.
2. Teacher and child to have mutual love for one another.

To the child it is still play, but it is organised, motivated play.

It is my object to introduce some of these properties for various subjects. All may be easily made in the house, at the expenditure of a little time and patience, by elder brothers and sisters, or mother in her spare moments.

ARITHMETIC.

This is not only a science, but an art, the technique of which calls for the study and observation of certain rules with which even the young child must become familiar, *e.g.*: He must understand the signs, +, —, ×, ÷; tables must be memorised, and coins recognised. At an early age the child begins to count the things with which he is associated. The following devices, however, have proved useful in Grade I., and it is possible to use them advantageously in the training of little children at home:—

1. A tray of patty pans, with numbers from 1 to 9 or 1 to 12, according to the number of compartments, pasted on. Numbers from an old calendar sheet are good. Vary the order so that the child must search for the exact number. Into each part, he must put the corresponding number of beads, buttons or gumnuts or similar counters.

2. Mount 10 match boxes in rows of 5 on to a piece of fairly stiff cardboard or threeply, paste calendar numbers 1-10 on heads, and it can be used similarly to the patty pans.

3. A device which children like is the Star Board—10 stars with points from 1 to 10 pasted on to cardboard. The child counts the points and places the corresponding number on each star. The numbers are kept in a match box, and a dot placed on the top of each number to show the right way up.

4. Blocks and match boxes used in building a long stair; threading beads on to a bootlace or thin wire; and threading cotton reels on fencing wire are useful devices for counting, addition, subtraction, multiplication and division.

5. Sandpaper figures help children to learn a thorough sense of feeling how to make them.

6. Dominoes help recognition of a number groups.

7. An old clock face with the hands or cardboard hands attached is a useful device for exercises in time, tables and addition.

READING AND LANGUAGE.

1. Letters cut in sand paper and mounted on cardboard are a great help to little children, also in writing letters, as they learn correct outlines.

Free expression during all lessons is encouraged, to enable the child to converse freely and correctly. In his games, let him say what he has done, what he is doing, and what he intends doing with certain toys.

2. Word and picture matching enables the child to build up a vocabulary, and at the same time trains him in spelling. Such cards may be made from pictures from catalogues, magazine covers and advertisements, separate the name cards in a box or envelope to be taken out and placed on the corresponding picture. Have words and pictures graded in difficulty, according to the stage of the child's reading.

Once the child has mastered his First Primer, he is eager to proceed with his Second Primer and Introductory Reader. So he progresses from book to book reading his story books, advertisements, and parts of the weekly papers that come into the home.

COLOUR MATCHING.

In training this sense and also that of touch, 2 pieces each of various materials and colours, all cut to the same size are put all together in one box. The child must match them. The pieces of material keep much neater if the edges are nicked. Children can do this themselves, it gives training in the use of scissors.

HANDWORK.

All children are filled with the desire to make and do things. This arouses their curiosity and developes self-activity and powers of observation. In outback homes, where various materials used to delight children at school are not obtainable, the mother may sometimes wonder how to keep the little fingers out of mischief. With this modelling paste children from 4 years upwards find much pleasure in forming many objects.

1. *Modelling Paste.*—3 parts flour, 3 parts salt. Mix to desired thickness with cold water to a consistency of stiff dough. Begin with such things as an apple, a carrot, &c., and proceed to objects of greater difficulty, *e.g.*, beads, canoes, igloo and many other objects will suggest themselves to the child. This paste may also be used to cover a nicely shaped bottle for a vase. When tinted with water colours, it can be made most attractive.

2. *Toys.*—A great variety of toys can be made from matchboxes, *e.g.*, furniture for doll's house, carts, train, doll's pram, houses. With the use of paper fasteners, corks, pill boxes, brown paper, pins and thin wire the children will soon evolve new ideas, so that this becomes a most fascinating activity.

3. *Kettle holders* and oven cloths made from sugar bags can be attractively embroidered in tack or running stitch in bright wools or dyed string.

4. *Mosaic Work.*—The boys derive much pleasure from this work. The examples here are—(1) An ordinary glass jar; (2) a saucer; (3) an old enamel plate, covered with small triangular pieces of brightly coloured papers, pasted on and then outlined. A coat of spirit varnish makes them very durable.

5. Plaited binder twine gives many ideas for articles ranging from teapot stands to door-mats.

6. Beads from triangular pieces of paper, wound over a needle-point pasted down, allowed to dry, then thread, trains little fingers to accuracy.

Ring and Stick Laying.

As a preparation for drawing ring-laying causes much amusement and fascination, and develops originality. Rubber rings from preserving jars are excellent for this purpose. Lay the rings on the table in patterns. The child then can draw round the outside edge. This gives training in drawing curved lines. The child will soon find original designs.

Stick Laying.—Matches are good, and they may be used to make patterns requiring straight lines. The two combined with lengths of wet string give opportunities for endless activity.

Paste Recipe.

A recipe for a good keeping paste, as used in the making of the devices referred to in this paper, is as follows:—¼lb. flour, ½oz. powdered alum, 1tsp. powdered resin. Mix to a cream with cold water. Add 1 pint water. Heat *gently*, stirring all the time. Boil 5-7 minutes. Cool; add a few drops of formalin. Keep in screw top jars.

It is hoped that these few ideas will help outback mothers to supplement the work of the Correspondence School and at the same time bring happiness to the little ones in their care. May they, when they take their places as citizens, realise that the "object of education is the realisation of a faithful and pure life".

Discipline in the Schoolroom

[*Paper read at the Forty-eighth Congress of the Agricultural Bureau, September,* 1937.]

[Mrs. S. Perrin, Koolunga Branch.]

In introducing my paper, I might ask the older ones amongst us who do not remember our schooldays, when the majority of teachers ruled with a "rod of iron". We did our work because we feared the teacher, and never knew what moment his strong right arm might fall on us. He taught with the spelling book in one hand and the cane in the other. Did we like school? Well, very few of us. Do we remember stand-up fights between the teacher and boys? I think most of us do.

Have any parents even been interested enough to wonder why the majority of children now love school; why they cry if they have to be kept at home? I think that the following will give some idea as to why the children do not find school and school tasks so irksome.

Gardening

[*Paper read at the Forty-eighth Congress of the Agricultural Bureau, September,* 1937.]

[MRS. A. S. MICHAEL, Snowtown Branch.]

"A mass of flowers in a quiet garden is like a tonic to hearts that grow tired."

Every man and woman should have a hobby, and gardening is one of the most delightful hobbies one can choose. It is not expensive and is quite within the reach of the average pocket, and the exchange of plants, seeds, &c., is one of the charms of having a garden.

To be a successful gardener, the soil must first be treated to suit different plants, &c., and protection against strong winds is essential.

The water supply we have in the Snowtown district makes gardening somewhat more difficult than if water was available. Trenching the ground is the best way for growing flowers to perfection. Usually have the soil taken out of the beds about 12in. deep and fresh earth put in, otherwise it becomes saturated with injurious salts from the continual watering during summer.

An important point in gardening is whenever any portion of the garden is likely to remain vacant for any length of time, roughly dig it and leave it in lumps exposed to sun and rain—also a good dusting of lime helps to make heavy, clayey ground loose and easy to work.

FERTILISERS.

Well rotted horse manure is highly recommended for adding to our garden beds, and also it is most useful for mulching. Cow manure is useful for forcing the growth of plants when it is applied as a liquid manure. Superphosphate may be used, but with the utmost care. When applying floraphos, liquid manure, sulphate of ammonia, &c., it is always advisable to water the soil around plants on which it is intended using the stimulant.

SPRING AND AUTUMN FLOWERS.

If flowers are required in winter, early planting should be done in the sunniest positions. Iceland Poppies, Antirrhinums, Stocks, Carnations, Sweet Peas, also the beautiful bulbs, namely, Ranunculi, Daffodils, Lachenalia, &c., and roses are well recommended to grow in our district. Roses need very little attention other than watering, pruning and manuring. Some very good roses are Dame Edith Helen, Golden Emblem, Shot Silk, Daily Mail, Scented, Red Letter Day, Hadley, Sunburst, Talisman, Sunny South. Bush Roses are preferred to Standards, because the wind does so much harm to the blooms of the latter.

I prefer autumn gardening, though, of course, there is more watering and mulching to do. Firstly, Gaillardias are a most useful and hardy flower to have in the garden, for they will bloom well when water restrictions are enforced. Cosmos, Zinnias, Guinea Gold, Marigolds, Dahlias, and Chrysanthemums all help to make a bright show in the autumn.

SHRUBS AND CREEPERS.

No garden is complete without a few shrubs and creepers, and there are some wonderful shrubs that will bloom for nine months of the year, namely:—Red Tecoma, Lantanas, Bougainvilleas, and many other varieties. When the flowering period is over the shrubs should be pruned very hard, well dug around, and super applied.

Creepers are very pretty when well grown, but unsightly if not cared for. I have a pretty blue creeper called "Solanium," which flowers for many months; also there is the "Golden Glory" creeper.

Rockeries are at the present time very popular and most fascinating, as we have some wonderful coloured stones to build pretty rockeries in our district. One can have a rockery where it would be almost impossible to have a flower garden, as it does not require a lot of water. The average rockery plant seems to be very hardy, and very pretty and bright. The most suitable place to build a rockery is to have a background, either a wall, hedge, or some creepers, and, if possible, to have the rockery watered from a sprinkler on the top of the rockery. There are many different species of plants:—Verbenas, Crassulas, Cacti, Portulaccas, Phlox, and Petunias do very well if grown on a sheltered part of the rockery.

A garden is really a necessity to beautify a home, and we can often brighten up a sick person with some flowers, and, after all, it is easy with a little time and attention to grow flowers.

"It is only when we have tended them ourselves that flowers have things to tell us."

At the conclusion of Mrs. Michael's paper, Mr. A. J. Quarrell ("Speargrass" of "The Mail") commented on it and answered numerous questions put to him by delegates.

Sir Stanton Hicks (Professor of Physiology at the University of Adelaide) addressed delegates on the aims and anticipated methods of procedure of the committee conducting the Federal Nutrition Survey.

Delegates were very interested in his proposed work, and promised to discuss it further with their Branch members.

Wednesday, 15th September.

AFTERNOON SESSION.

Mr. C. T. McKenna, B.V.Sc. (Veterinary Officer, Stock & Brands Department) addressed Congress on "Veterinary Notes for the Housewife", and answered queries from delegates on various veterinary matters.

Miss Ellie Campbell, of the Education Department, showed several films on "The Centenary Children's Floral Pageant", which were very much enjoyed by those present.

The following resolutions were carried:—

"That the exchange on Eyre's Peninsula cheques be reduced to 3d. as in other parts of the State."

"That more lady lecturers be made available to visit the various Women's Branches."

"That we have more space in the *Journal* for the ladies."

"That a dentist be sent to the outback periodically, or otherwise arrange for a local dentist to visit schools at regular intervals."

"That the Postmaster-General be approached that a 50 per cent. reduction be made in the fees for private mail bags."

"That provision be made for six scholarships for girls so that they can take up secondary training in whatever course they desire."

"That the Railways Department be asked to provide better facilities for train travelling on Eyre's Peninsula to the boats for Adelaide just before Show Week."

"That the session for discussions of motions submitted be held earlier in the Congress, preferably a morning session."

"That the Women's Branches of the Agricultural Bureau of South Australia apply for affiliation with the South Australian National Council of Women, and also for affiliation with the Associated Country Women of the World."

Mrs. C. W. Dolling spoke to delegates on the work and objects of the National Council of Women and the Associated Country Women of the World, and answered queries submitted.

Thursday, 16th September.

During the morning delegates were able to visit the Waite Agricultural Research Institute or the Australian Glass Manufacturers' Co. Ltd. at Kilkenny. Those who visited Waite Institute in the morning were able to go to the Glass Works in the afternoon.

Strathalbyn Women's Display at Show.

Any woman who has labelled a jam jar or set bread to rise would be thrilled with the magnificent demonstration of home industry in the country in the Strathalbyn Agricultural Bureau's exhibit in the Centennial Hall at the Royal Show. Appropriately set by benches of sifted corn and winnowed wheat, the exhibit was the combined effort of both men and women of the district, and the women's entries, which formed a most spectacular array, include every phase of housekeeping from curing bacon and making wine to fashioning binder twine mats and manufacturing coloured candles.

Rows of jams and jellies, cordials, and bottled fruits gave an attractive colour note to the display, and the comprehensive range of preserves include pigeons, fish, eggs and bacon, leeks, artichokes, celery and even green almonds. Other exhibits were bread, in twists and rolls and buns, a beautifully iced wedding cake, and an elaborate Dolly Vardon cake for a party. About the floor were attractive fox and sheep skin rugs, and knitted and crochet cushions, quilted rugs and stuffed toys. A most complete doll's house was in the foreground, complete with gravel paths and lawn.

The conveners of the different sections arranged by women were:—Jellies, Mrs. S. Arnold; preserves, Mesdames Hudd, L. Hall and E. Stirling; jams, Mesdames H. H. Cross and J. G. Bowden; pickles, Mrs. G. Sissons; sauces, Mrs. P. G. Martin and Miss O. Bottrill; miscellaneous, Mrs. R. Maidment; chutney, Mrs. H. Dunn; sweets, Mrs. C. L. O. Wyatt. Mrs. Clyde Hudd is secretary of the women's branch of the bureau.

Narridy.

During the two years of its existence members of the Narridy branch of the Agricultural Women's Bureau have staged two fine exhibitions. Last year the judge expressed the opinion that it was the best fixture of its kind that had been held in the middle north districts of the State. This year's exhibition, however, which was held on 26th September, surpassed the initial effort in entries, quality of exhibits, and the staging of the displays. This was due in no small measure to the enthusiasm of the president (Mrs. Klinger) and the secretary (Mrs. H. Siviour).

Mr. F. C. Richards (assistant secretary of the Agricultural Bureau) opened the exhibition, for which entries were confined to members of the bureau. More than 200 women attended, including many from Gladstone, Crystal Brook, Georgetown, Beetaloo Valley, and Port Pirie.

An outstanding feature was the class for an exhibit of one woman's work in which only two entries were received—from Miss L. Roberts and Mrs. M. I. Reynolds. The judge (Mrs. Shottswood, of Gladstone) spent over two hours at this class, for which which a special prize had been given by Mrs. Eagle. Each competitor displayed more than 100 items, including all classes of needlework, cookery, and preserves, paintings, and polishes, soaps, and cleansers. The judge was unable to separate the competitors, and the committee gave another special prize of equal value. Exclusive of this section entries were more than 50 in advance of last year.

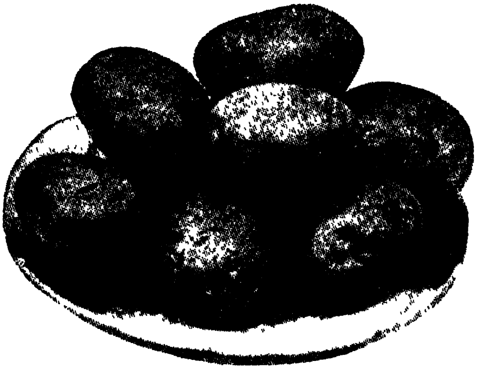
The Committee of the Narridy Women's Branch.

Southern Women's Bureaux First Conference.

Presided over by Mrs. J. McCarthy, Women's Bureaux in Southern Districts, held their first Conference at Milang on 19th August. An excellent display of women's handcrafts added to the value of the gathering. In addition to an address by Miss E. Campbell, of the Education Department, the following papers were read:—

The Potato and Its Value.

[Mrs. M. Collett, Strathalbyn.]



Thrifty housewives know that a big potato crop means a cut in the family food bill. When potatoes are plentiful, they may be used widely, for their mild flavour does not become tiresome, and they are wholesome and easy to prepare. The potato contains valuable proteins, minerals, and vitamins, in addition to its starch; so that it need not be a forbidden food for persons on a reducing diet, provided it is properly balanced with milk, meat, fish or eggs. In comparing the value of the potato with cereal foods scientists have found it has a better muscle-repairing content. It is very high in alkaline salts, which are needed to offset the acid salts of meats. It is fair in iron, low in vitamin B, but high in vitamin C, and it contains one of the easiest starches to digest. Vitamin A, it will be remembered, is very important, as it gives increased resistance to infections. Vitamin B determines the quality of the appetite and prevents poor nutrition conditions. Vitamin C, in which the potato is rich, prevents scurvy.

While the iron in potatoes is not high, yet if they are eaten in liberal quantities, the iron becomes of value. The potato is also low in lime salt, but this is easily supplied by using plenty of milk when serving potatoes. The high vitamin C value of the potato has been known for many years. In the famines in Ireland—when potatoes were the only food—there was no scurvy; also in the days of sailing vessels, it was commonly known that when ships had a plentiful supply of potatoes the sailors never suffered from scurvy.

Potatoes Build Muscles.

In several studies made with adults who were fed a uniform diet including potatoes to the extent of 2lbs. to 2½lbs. a day, body weight stayed nearly constant, digestion was good, and people did not tire of the diet. These studies indicated that the potato is able to sustain the body in a state of nitrogen balance, so that even in muscle-building this vegetable is a distinct aid in the diet when costs must be considered.

In comparing the value of the potato with wheat bread one 3oz. potato is equal to 2 slices of white bread; or 10 medium sized potatoes equal to a 1lb. loaf of bread. The main heat-producing value of the potato is in its starch, which has been known as one of the most satisfactory of starches for human food. It is of interest that in human feeding, where the potato is used as one of the main foods, even up to 2lbs. or 3lbs. in the diet, steaming was found most satisfactory for the long period, but the potato lends itself to all methods of cooking. The problem is to reduce the quantity of mineral loss by safeguarding the methods. In careless preparation and cooking as high as 30% of its food value may be wasted. This loss is greatest in muscle building material (protein) and in mineral matter. For example; (1) peeling and slicing the potato and allowing it to stand a long time in water before cooking, waste the protein and mineral matter; (2) placing the peeled potato without previous soaking in cold water and bringing the water quickly to boiling point wastes protein and mineral matter; (3) placing the peeled potato at once in salted boiling water, and boiling the water rapidly results in less protein and mineral matter; (4) baking or steaming the potato with the skin on wastes none of the protein or mineral matter. If roughage is needed in the diet, baked potatoes should be eaten with the skin on; (5) cooking the unpeeled potato without water in a heavy covered vessel over the direct heat, destroys neither protein nor mineral cooked. The rule should be to boil or steam the potato and remove the skin after it is cooked. Then it may be cut into the form appropriate to any of the ways in which it can be served. If peeled and cooked in boiling water, the water in which it is cooked should be used with the potato or used in making soup or in making bread, because the water in which it is boiled may contain 30% of the protein and 30% of mineral matter.

The most wasteful method of preparation and cooking may mean a loss of over half the protein and over two-thirds of mineral matter. Potatoes of medium size should be baked 30 to 40 minutes to make them mealy. Large potatoes should be boiled for 5 minutes and baked in a hot oven for 40 minutes. If the skin of the potato is rubbed with sweet fat and then baked slowly in a moderate oven 50 to 60 minutes, it will make the skin tender and edible. Baked potatoes must be broken open as soon as tender. Too much cooking will—because of confined steam—make the starch sticky and the potato soggy. When potatoes are baked and the family is not ready for them, the potatoes may be cut in halves, and the mealy centres removed, beaten smooth with cream or fat, returned to the shells and kept warm in the oven. To boil potatoes, place washed, but unpeeled potatoes in salted boiling water (1 teaspoon of salt to 1 quart of water). Boil 20 to 30 minutes or until easily pierced with a fork. Drain the water. Heat the potatoes in a dry vessel until all water is evaporated from the surface. Remove skins and prepare according to any rule for cooked potatoes. To steam potatoes without peeling, the process must be continuous and rapid for about 30 minutes. When tender, they should be removed from steam and dried in a hot oven. They are then ready for further preparation before serving, or they may be served in their jackets. The potato being mild in flavour, lends itself to varied uses with other foods. Because of its potash salts, common salt must be used in the cooking, because it is vital that the two salts should balance each other in the normal human body.

Some of the members of the Boor's Plains Branch which entertained visitors at the Field Day on 7th October

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All communications to be addressed:
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A. P. BLESING, *Minister of Agriculture*

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Agricultural Shows

We have been advised by Secretaries of Agricultural Show Societies that their shows will be held on the following dates:—

Mundalla, Wednesday, 9th March, 1938.

Mount Pleasant, Thursday, 17th March, 1938.

Overseas Wheat Quotations

By courtesy of the New South Wales Marketing Bureau, the South Australian Department of Agriculture is supplied regularly with statements showing overseas quotations for wheat to the nearest eighth of a penny. The accompanying table gives weekly quotations in London, the State or country of origin of the wheat, and months of shipment or delivery.

Date of Quotation.	London Values.								
	S. Aus. Wheat.	W. Aus. Wheat.	Manitoba No. 3 Wheat. ex Atlantic Ports.	Argentine Wheat.	Karachi Choice White Wheat.	American Hard Winter Wheat.	White North Pacific Wheat.	Russian.	
	Oct.	Oct.	Oct.-Nov.	Jan.-Feb.	Oct.-Nov.	Oct.-Nov.	Oct.-Nov.	Oct.-Nov.	
1937.	*s. d.*	*s. d.*	*s. d.*	*s. d.*	*s. d.*	*s. d.*	*s. d.*	*s. d.*	
Oct. 14..	5 8⅝	5 8¼	5 7⅞	5 3⅞	5 6⅜	5 1⅞	5 1½	5 3¾	7,500 tons Australian wheat (Jan.-Feb.) from all ports at 5s. 3⅜d. Western Australia, 7,500 tons (Nov.), 5s. 5¼d.
Oct. 21..	5 7⅜	5 7⅞	5 10¾	5 4¾	5 6⅜	5 2½	5 1	5 4⅛	New South Wales—Parcel 300 tons (afloat), at 5s. 6⅜d.
Oct. 28..	5 6¼	5 7⅛	5 9	5 5⅛	5 4⅞	5 1⅛	4 9¼	5 2¼	
	Nov.	Nov.	Nov.		Nov.	Nov.	Nov.-Dec.	Nov.	
Nov. 4..	5 5⅝	5 3¾	5 5⅞	5 3⅞	5 4½	4 9⅝	4 8⅝	5 0	
Nov. 11..	5 3	5 1⅛	5 5⅝	5 3⅛	5 3¾	4 . 9⅜	4 6¾	4 8⅝	

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Progressive Centennial Development of the Pastoral and Agricultural Industries of South Australia, 1836—1936

[By ARTHUR J. PERKINS, O.B.E., Life Member of the Advisory Board of Agriculture and of the Agricultural Bureau, Chairman of the Governing Council of the Roseworthy Agricultural College, sometime Director of Agriculture (1914-1936), Principal Roseworthy Agricultural College (1904-1914), &c.]

(*Continued from page* 228).

THE FIRST DECADE, 1836-1846.

CHAPTER IX.

The Mount Barker Special Survey—Early reputation of the land—Opinions of Hawdon and Sturt—Stevenson's exultation—Dutton settles contingent of German Refugees at Mount Barker—McLaren takes up Special Survey at Lyndoch Valley for South Australian Company—His attempt to secure priority of choice at Mount Barker over Dutton foiled by the Governor—Correspondence on the subject.

"*Notice is hereby given that the sum of £4,000 having been deposited with the Colonial Treasurer by William Hampden Dutton, late of Sydney, but now of Adelaide, a Special Survey of 15,000 acres in the District of Mount Barker has been ordered by His Excellency, the Resident Commissioner to be commenced immediately in order that 4,000 acres may be selected therefrom by Mr. Dutton in conformity with the Regulations for the disposal of land.*"—*11th January,* 1839. (1)

It was in these terms over the signatures of George Milner Stephen and George Hall, acting jointly as Assistant-Commissioner, that the taking of the celebrated Mount Barker Survey—the first Special Survey to be claimed in the Province—was announced to all and sundry. On the map on which were outlined the Southern Districts surveyed by Colonel Light, together with the Special Surveys claimed in 1839, the Mount Barker Survey was given the distinguishing number of "9". There, it might be seen nestling amidst the best watered and most fertile of the valleys of our hills' country: and due to its relative proximity to Adelaide and the outstanding excellence of its natural pastures it had attracted the attention of settlers from the earliest days of settlement: and to-day scattered over its 15,000 acres we find the townships of Mount Barker, Mount Barker Junction, Littlehampton, Ambleside, Hahndorf, and Verdun. It was there that John Barton Hack and his brother had come to establish their well known Cattle Station, but not as proprietors of the land, or even as tenants, but merely as "squatters": there, too, at a later date, but on a similar venture bent, came Captain John Finnis—"of the Mercantile Service", said Captain Sturt, (²) whom Finnis had companioned with the third Overland Herd of Cattle to South Australia. Yet neither of these experienced campaigners seemed to have taken the elementary precaution of clinching their right to the choice tracts of country upon which they had so successfully "squatted": it might have been that like McLaren, they were playing waiting hands, but unfortunately for themselves temporised a bit overmuch, and eventually had to surrender their fair pasture lands to an aggressive stranger of quite different mental outlook. It was however true that Finnis was subsequently stated to have been associated with Dutton in the estate (³): but the same was said of Moore and MacFarlane, both of Sydney (⁴); and even of Osmond Gilles, the "fortunate" Colonial Treasurer (⁵). Nevertheless, the Special Survey was taken out in no other name but that of "Dutton": and as to the correctness, or otherwise, of these gossipy surmises, it was difficult to determine at this distance of time.

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(1) *South Australian Gazette and Colonial Register,* 12th January, 1839, page 1, col. 3.

Captain John Finnis (1803—1872), of the Mercantile Service.
[*Plate 54.*] (*Courtesy Archives.*)

Mount Barker, too, had become the long looked for goal of the "Overlanders": the "Capua" in which man and beast might luxuriate and recuperate from the strain and privations of long and trying journeys. "Leaving the Murray" said Joseph Hawdon, the pioneer Overlander, in a letter to Governor Hindmarsh, "about the latitude of Adelaide, we were compelled by the ranges to go more to the south, and thus pass near to Mount Barker. In that district we passed over a beautiful and extensive tract of grazing country, especially that lying between Mount Barker and Lake Alexandrina, which equals in richness of soil and pasturage any I have ever seen in New Holland". (⁶) "The

(²) *South Australian Gazette and Colonial Register*—Official Report of Captain Sturt's overland journey to South Australia, 12th January, 1839, page 2, col. 3.

(³) *South Australian Gazette and Colonial Register*, 2nd February, 1839, page 2, col. 4.

(⁴) *South Australian Gazette and Colonial Register*, 12th January, 1839, page 2, col. 1.

(⁵) *South Australian Gazette and Colonial Register*, 27th October, 1838, page 2, col. 2.

country at the base of Mount Barker", wrote Captain Sturt, himself an overlander and a man of considerable experience, to Acting-Governor G. M. Stephen, "where we had fixed ourselves for a time, is of great pastoral capability. It is broken into rounded hills and warm valleys, clothed with plentiful verdure and watered by numerous chains of ponds; and in its present state far exceeds in richness any portion of New South Wales that I ever saw. Indeed, even in England, I have seldom observed a closer sward or more abundant herbage growing". (⁶) And again in his official report to Governor Gipps Captain Sturt stated:—"We ultimately fixed a station under Mount Barker, about 28 miles from Adelaide, in a country far exceeding in richness any we had hitherto seen." (⁷)

Osmond Gilles (1797—1866), First Colonial Treasurer.

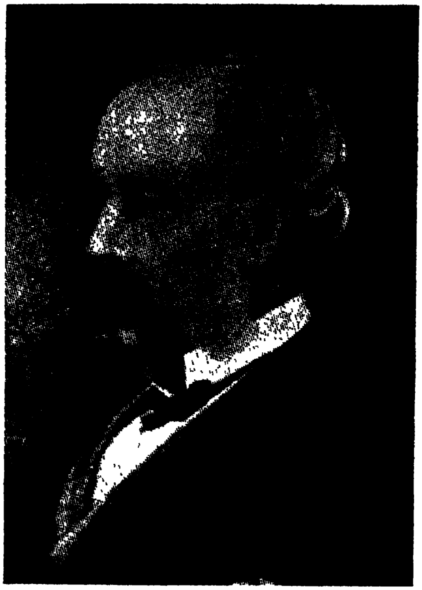
[*Plate 56.*] (*Courtesy Archives.*)

George Stevenson, on the other hand, gloated over this inter-colonial success in characteristic style: "We have at length the happiness to announce that a Special Survey has been ordered . . . these gentlemen"—*i.e.*, Dutton, MacFarlane, and Moore—"we are told, have been delighted and astonished at the freshness of our pasture ranges when compared to the burnt up and withered plains of New South Wales, and this purchase is a tolerably distinct proof of their opinion . . . We heartily congratulate the friends of South Australia on this event. When we see gentlemen who are thoroughly acquainted with the richest districts of New South Wales, Port Phillip, and Portland Bay, settling down amongst us—bringing their families, their herds and flocks, to our plains and valleys, we believe more confidently than ever that we are right, and that South Australia must continue the same course of advancement that she has so triumphantly begun." (⁸)

But over and above the excellence of its natural pastures, the Mount Barker district was particularly well adapted to the practice of mixed farming—*i.e.*, the intimate association of crop and livestock operations—on a moderate and even a small scale—a type of farming with which settlers from Great Britain, and indeed from the greater part of Western Europe had been familiar from time immemorial. It followed therefore that if full advantage were to be taken of the Special Survey from the outset, the land would have to be parcelled out into appropriate sizes, and sufficient men settled thereon, able and willing to do justice to the exceptionally favourable conditions that obtained there. Dutton and his associates—if such there were—seemed to have accurately gauged the opportunities against which they had stumbled and being men of action and of quick decisions, they lost no time in attempting to turn them to account: and as frequently happened when the will to act was clear-cut they met with considerable assistance from a purely fortuitous circumstance: the very men that seemed essential to the plans they had in mind had but recently reached the Province aboard the *Zebra* from Hamburg—on the 28th December, 1838, thus ante-dating Dutton's claim for a Special Survey by about a fortnight.

(⁶) *South Australian Gazette and Colonial Register*, 27th October, 1838, page 2, col. 2.
(⁷) *South Australian Gazette and Colonial Register*, 19th January, 1839, page 2, col. 3.
(⁸) *South Australian Gazette and Colonial Register*, 12th January, 1839, page 2, col. 1.

W. H. Dutton himself had reached South Australian waters from Sydney, aboard the *Parland* on the 26th December, 1838 (⁹): he was accompanied by his wife and two children, and among his fellow passengers were N. and T. Moore, and Duncan MacFarlane, all of whom were subsequently supposed to have partnered him in the Mount Barker Special Survey "The *Parland,*" said George Stevenson, "has brought a full cargo of sheep and horses on account of W. Hampden Dutton . . . We congratulate the colonists on the accession of another enterprising and well informed settler; and we trust in the course of the approaching season to welcome many such. We are glad to hear that out of 1,500 sheep only three have been lost on the passage." (¹⁰)



William Hampden Dutton, Merchant and Stockholder.

[*Plate* 56.]

Two days after the arrival of the *Parland*—on the 28th December, 1838 to be precise—the *Zebra,* Captain D. M. Hahn, from Hamburg, sailed into the roadstead with 190 German Emigrants aboard: these, it seemed, were refugees fleeing from the religious tyranny of the King of Prussia. This vessel had been chartered by G. F. Angas & Co., who, too, had apparently advanced the passage money of the Emigrants, on the understanding of repayment in the colony, as soon as circumstances permitted. Apart from a limited number of indentured servants—but unprofitable ones as it eventually proved—brought out by the South Australian Company, the *Zebra* was the third vessel to come specially freighted with Emigrants from Germany to South Australia. The first vessel was the *Bengalee,* Captain T. Hamlin, which reached South Australia with 180 German Emigrants on the 16th November, 1838; the second the *Prince George,* Captain F. Chilcott, with about 200 Emigrants on the 18th November, 1838; and the fourth the *Catherina,* Captain Schalt, or Peter Schacht, with 122 Emigrants on the 22nd January, 1839. (¹¹)

Dutton, the newcomer, would naturally be told of so important an event as the arrival of a vessel with 190 German Emigrants aboard; or even before leaving Sydney he might well have heard that the Emigrants were on their way to South Australia: for Sydney had sought to secure German Emigrants on terms even more liberal than those offered in Adelaide, but had failed and was inclined to look askance upon South Australia's success: (¹²) in any event we had documentary evidence that Dutton had boarded the *Zebra* shortly after her arrival in South Australian waters, and together with others, had expressed satisfaction with the general arrangements of the ship for the comfort of the Emigrants. (¹³) On the other hand, Dutton's evident anxiety to secure for his new South Australian estate the vessel's full complement of Emigrants, would seem to indicate that he had already heard how well earlier contingents had

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(⁹) *South Australian Gazette and Colonial Register,* 5th January, 1839, page 4, col. 4.

(¹⁰) *South Australian Gazette and Colonial Register,* 29th December, 1838, page 3, col. 1.

(¹¹) South Australian Archives, G. H. Pitt to Professor A. Lodewyck of the University of Melbourne, 18th November, 1930.

(¹²) *South Australian Gazette and Colonial Register,* 6th April, 1839, page 2, col. 3. See also Appendix VIII. at back of volume.

(¹³) See Appendix IX. at the end of volume.

acquitted themselves in their adopted country: and as he had not been an "overlander", but merchant-like had chosen to cling to the comforts of the summer seas for his voyage over; and as we could hardly credit him with unerring instinct in the matter of land that he had never seen, we were bound to conclude that before setting out for South Australia with his family, his livestock, and his goods and chattels, he must have heard of the fame of the Mount Barker pastures from quite dependable sources: from Joseph Hawdon, maybe; or perhaps from Sturt or from Eyre; or better still from Captain John Finnis, "of the Merchant Service"—another New South Welshman, who having shrewdly "squatted" in the fertile valleys of Mount Barker, had found his personal means inadequate to the purchase of a Special Survey, and had probably corresponded on the subject with wealthier Sydney citizens; one of whom at least, had presently appeared on the scenes, suitably provided, and of whom the mercantile captain is said subsequently to have become a partner. It was, of course, obvious that the above line of reasoning was not altogether in accord with George Stevenson's supposedly eye-witness account of the course of events: but the latter's local patriotism and belief in South Australia were notoriously perfervid—so much so that he had little to spare for the inhabitants thereof—justifying any statement, so be it ultimately led to the glorification of his fetish: hence when he asserted "That Messrs. Dutton, MacFarlane, Moore, and others from Sydney, had been so struck with the surpassing fertility of the Mount Barker district when compared to the richest tracts of New South Wales, that although they had arrived in the Province without the slightest intention of buying land or becoming settlers, had at once demanded a Special Survey of 15,000 acres, and intimated their resolution to send for numerous flocks and herds and become citizens of South Australia." (14)—We must not be misled by the rhetorical special pleading of a journalist, however much the circumstances might appear to warrant it. It might well have been that some of the Sydney visitors on board the *Parland* had never intended originally settling in South Australia; MacFarlane, for example: but what of Dutton, in whose name the Special Survey was taken, and who had filled up a 546 ton barque with his family, his livestock, and his goods and chattels? Surely from the time he first set foot aboard the *Parland* in Sydney he must have had all the appearance of an emigrant and a prospective South Australian settler? We can, however, accept with greater confidence the conclusion of Stevenson's statement, except for the unfortunate mutilation of a quite euphonious town-name:—

"Dutton and his friends have not been contented with merely purchasing the land,—they have determined to people it; and the favourable opportunity afforded by the recent arrival of numerous German Emigrants has not been overlooked. The whole body of Germans, in number 190, brought by the *Zebra* from Hamburg, are proceeding directly from the ship to Mount Barker, and the township is forthwith to be established there under the name, we believe of "Kandtsdorf." (15) The men are chiefly mechanics, shepherds, bricklayers, masons, &c., and form in fact the whole material for a community. With a liberality we cannot sufficiently applaud and admire, these poor people are to be put in possession of certain allotments of ground, rent free for the first twelve months; to be supplied gratis with rations and seed, till their crops are gathered in. Each family is to have the free use of at least one dairy cow, and the men are to be paid the ordinary rate of wages when employed. A church and schoolhouse are to be built, and an endowment made for a clergyman. Mr. Dutton has given £20 and Mr. MacFarlane £10 towards the building of the church; and several other gentlemen have already contributed very liberally. Here then without professions or the talk of a couple of years, are results as creditable to the gentlemen immediately interested as they are important to the Province." (16)

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(14) *South Australian Gazette and Colonial Register*, 19th January, 1839, page 2, col. 3.

(15) Hahndorf—Hahn's Village—the humble tribute of emigrants from a distant land to a sea captain who had dealt humanely with them on the voyage of exile.

But whilst many—perhaps the greater part of the settlers—heard with satisfaction that the first Special Survey had at last been claimed, there were at least two men in the colony who bitterly rued the day, namely, John Barton Hack who, through lack of foresight, had been unceremoniously bundled out of his pleasant and profitable "squatting" grounds, and David McLaren, who from the outset had intended that the South Australian Company should occupy the position into which an interloper had slipped at the eleventh hour. It had already been stated that after a protracted period of vacillation, McLaren had suddenly realised early in November, 1838, that "the time to act" had come—*i.e.*, to claim Special Surveys—but that a series of unavoidable delays had prevented him from taking definite steps in that direction until the 8th January, 1839, when he set out northwards, with an imposing retinue, to inspect land said to be suitable for the purpose by Sturt and Light respectively. He returned thence to town in order officially to claim a Special Survey in the Lyndoch Valley on the one hand, and on the other to take part in a special meeting on the 16th, called for the purpose of selecting land at the New Port: he had also resolved to proceed immediately after the meeting to Mount Barker in order to select a Special Survey in that district. Great therefore was his mortification to learn on reaching town, that not only had W. H. Dutton forestalled him as first claimant for a Special Survey in the Province; but what was worse that he had secured thereby that portion of the country which in popular estimation was the best available in the Province, including as it claimed to do, the Cattle Stations of J. B. Hack and John Finnis respectively. Dutton's apparent success in this matter was looked upon by McLaren as no less than a blow to the latter's pride and business efficiency for which it behoved him to seek early amends: and his clever, busy brain was soon considering ways and means thereto. He first ascertained that Dutton "had pointed out the district in the most vague terms imaginable, namely, as in the Mount Barker Valley, including the Cattle Stations of Messrs. Hack and of Mr. Finnis" (17) respectively, and resolved, if at all possible, to seek his profit therefrom: nevertheless, at this distance of time it was difficult to realise that McLaren's own description of the Lyndoch Valley Special Survey was any more definite, namely, "to hold a Special Survey of the district including the valley known by the name of Lyndoch Valley." (18) From that moment there started a game of tactics, in which the cleverness, resourcefulness, and guile of McLaren were pitted unavailingly against the indulgent patience which screened the determined will of Governor Gawler: the progress of the game, to its fated end, had been set out in detail in a series of letters, which because of their importance and general interest had been given *in extenso* in Appendix X.

McLaren's opening move—Letter No. 1 of Appendix X.—was a formal application for a Special Survey in the Mount Barker District but expressed in terms more vague even than those with which McLaren had reproached Dutton; this letter seemed to have served a double purpose: of which the first or more

(16) *South Australian Gazette and Colonial Register*, 19th January, 1838, page 2, col. 3.

(17) David McLaren to Edmund J. Wheeler, 26th January, 1839.

(18) David McLaren to George Hall, Private Secretary, 15th January 1839.

obvious or ostensible purpose must have been "to peg out" a legal claim however vaguely expressed which for the time being should suffice to keep intruders at a distance; but the second, and more subtle purpose, and perhaps the main purpose, would seem to have been to induce the Governor to commit himself in writing as to the degree of descriptive vagueness he would be prepared to accept in applications for Special Surveys. (19) And in both directions this first move of McLaren's must be taken to have succeeded; since whilst maintaining the district free from trespassers, it drew from the Governor's Secretary the following definite admission:—"Unless you give such a description of the district, which you desire to select, as may be sufficient to enable the Resident Commissioner to identify it, such district cannot be secured to you. *Priority of choice must of necessity depend upon priority of description.* (20)

First Government House, Adelaide. About 1837.
After a sketch by Colonel Light, in the possession of the Adelaide City Council.
[*Plate 57.*] (*Courtesy Archives.*)

With this admission in his pocket, or in his desk, David McLaren proceeded with all speed to the Mount Barker District on 16th January, with a diminished retinue—Samuel Stephens and William Randell only. "We determined" he wrote "on claiming a Special Survey there, including the Cattle Company's Station, and those of Messrs. Fenn and Bourchier" respectively. "We despatched a messenger to town, the distance being only about 20 miles, though over the stringy bark mountains, with a description of the claim for a Special Survey there, which we delivered to His Excellency the Resident Commissioner, previously to any description or sketch of the country by Mr. Dutton. We returned to town on the 19th" and "since then a correspondence entered between myself and the Private Secretary of His Excellency." (21) McLaren had stated in an earlier letter to the same correspondent:—"I claimed a Survey in that district, and am now in correspondence with the Resident Commissioner in support of my priority of choice" over "Mr. Dutton to a particular part described by me *before* it was named by him. The Governor is inclined to prefer Mr. Dutton's claim, but I am confident in an English Court I should establish my priority, and I will not relinquish it if possible. (22)

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(19) David McLaren to Private Secretary, 15th January, 1839. See also Letter No. 1 of Appendix X.

(20) Private Secretary to David McLaren, 15th January, 1839. See also Letter No. 2 of Appendix X.

In due course, McLaren's Mount Barker messenger got the better of the stringy bark mountains—which, by the way, were said at the time to be infested with bushrangers—and was able to present himself to Edward Stephens, Cashier of the Bank of South Australia, and McLaren's confidential representative during the latter's frequent absences from Adelaide, and hand over McLaren's description of the boundaries of the proposed Mount Barker Special Survey, with instructions to include the latter in a formal letter to the Resident Commissioner; and this accordingly was done. (23) In this letter the proposed approximate boundaries of the "compact" district were clearly—if somewhat clumsily—set out, namely, "15,000 acres at right angles to a line drawn from the opposite bank of the River known by the name of 'Angas' in front of the Joint Stock Cattle Company's dairy, and run by compass about north-east, so as to pass close by the stations of the Cattle Company and of Messrs. Fenn, Scott, Jones and Bourchier and Milne," all of which it was "intended to include." The Resident Commissioner, in reply, assured Edward Stephens "that the Survey" he "required for the South Australian Company was secured as far as it" might "not interfere with the Survey previously demanded by Mr. Dutton." Stephens was also told "that the Survey" he required stood "fourth upon the" current "list." (24)

On the 19th January McLaren—on his return from Mount Barker—followed up Stephens' letter with fuller details as to the boundaries of the proposed Survey which his "personal knowledge of the country" then enabled him "to add to the definition of the compact district mentioned in Mr. Edward Stephens' letter." These additions were in no sense of material importance, and throughout subsequent correspondence McLaren took his stand upon Stephens' letter of the 18th, rarely referring to his own of the 19th, probably on legal grounds of priority of date. He noted with satisfaction in a conversation he had with the Private Secretary on that morning "that the description given by Mr. Edward Stephens' letter" was "sufficiently explicit for the purpose," but he demurred to Mr. Hall's statement that "the Survey called for by the South Australian Company" should stand "fourth upon the" current "list." He—McLaren—suggested "that the order of the Surveys" should depend "not so much upon the time of payment of the money, as upon *"the date of the call for the Survey made on the Commissioner to direct the Survey of a specific compact district not exceeding* 15,000 *acres.*" (25)

On the same day, but before McLaren's letter could have reached him, the Private Secretary wrote a letter to Edward Stephens which was to prove the prelude to open hostilities. He briefly informed Stephens that Mr. Dutton had on that morning supplied a sketch of the country the latter wished to have surveyed at Mount Barker, and that that sketch included "part of the district described in Stephens' letter of the 18th, namely, the Stations of Mr. Fenn and of the Cattle Company. Stephens was of course at liberty to "see the Surveyor's sketch of the boundaries of the 15,000 acres at the Survey Office." (26)

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(21) David McLaren to Edmund J. Wheeler, 26th January, 1839.

(22) David McLaren to Edmund J. Wheeler, 22nd January, 1839.

(23) Edward Stephens to Resident Commissioner, 18th January, 1839. See Letter No. 3 in Appendix X.

(24) Private Secretary to Edward Stephens, 18th January, 1839. See Letter No. 4 in Appendix X.

(25) David McLaren to Resident Commissioner, 19th January, 1839. See Letter No. 5 in Appendix X.

The above letter was followed up on the 21st January by another one addressed to McLaren, and in reply to the latter's letter of the 19th—a Saturday, noted the Private Secretary, who appeared to have been exceedingly punctilious in matters of correspondence. The Resident Commissioner, he wrote, regretted McLaren's probable disappointment over the boundaries of the Special Survey which he—McLaren—had sought, but the Commissioner could not possibly interfere with "Dutton's right of prior choice." (27)

And promptly in reply came McLaren's lengthy masterpiece of the same date—proof presumptive, it would seem, in one who was not over-punctilious in the matter of correspondence, that the masterpiece had been held in reserve for some such contingency—a masterpiece which, it was hoped, would overwhelm the Governor with its specious facts and reasonings. McLaren returned his "grateful acknowledgments" for His Excellency's "kind consideration": but at the same time maintained "very respectfully yet decidedly" that he held "a right of choice prior to Mr. Dutton" and proceeded to give the Governor six good reasons in support of his contention thereto, namely:—

1.—Dutton's application for a Survey was for the Survey of 15,000 acres in the Mount Barker Valley "including the Cattle Stations of Hack and Finnis."

2.—It had been agreed by the Governor that unless such a description of a district were given that would enable the Commissioner to identify it, such a district could not be secured and that priority of choice must of necessity depend upon priority of description.

3.—That Edward Stephens had included and described the land in question in his application for a Special Survey in the same district, prior to the receipt of any reference to it by Dutton, "or by any person whatever"; and that Stephens' description had been admitted verbally by the Private Secretary to be sufficiently explicit for the purpose.

4.—That it had been established in conversation with the Private Secretary that down to the morning of the 19th January there had been no reference by Dutton to the Station of the Joint Stock Cattle Company, nor to those of Messrs. Fenn, Scott, Jones, Bourchier, and Milne, all of which, however, had been claimed by Stephens for the South Australian Company.

5.—That Dutton had "expressly violated" the Land Regulations by laying claim to a district greatly in excess of 15,000 acres.

6. That at a date subsequent to Dutton's original application he—Dutton—had laid claim to country which the Commissioner could not possibly identify as forming part and parcel of the original claim; and that such country had been claimed on behalf of the South Australian Company long before Dutton had put forward any claim to it.

McLaren had "entire confidence in the judgment and impartiality of the Resident Commissioner" and as he was "not aware of the slighest inaccuracy" in the above statement, he confidently anticipated a reply from the Commissioner favourable to the Company's claim. (28)

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(26) **Private Secretary to Edward Stephens, 19th January, 1839. See Letter No. 6 in Appendix X.**

(27) **Private Secretary to David McLaren, 19th January, 1839. See Letter No. 7 in Appendix X.**

(28) **David McLaren to Private Secretary, 21st January, 1839. See also Letter No. 8 in Appendix X.**

To the above the Private Secretary briefly replied on the 22nd January "that in the present state of the knowledge of the face of the country" the Commissioner could not require from the outset "minute descriptions of boundaries from individuals demanding Special Surveys. He was decidedly of the opinion that Mr. Dutton" was "entitled to the country" he had claimed. All that the Governor could do for those who imagined that their rights had suffered from such a decision was to allow them on application the right to claim a Special Survey in some other district. (29)

At this stage McLaren no doubt realised that there were other claimants for Special Surveys in the field and consequently that if he could not get possession of Mount Barker it had become urgent that he should take early steps to secure a Survey in some other suitable district; and accordingly there was no delay in his reply to the Governor's last letter. He wrote on 24th January to the effect "that agreeably to the permission of His Excellency as intimated in" the Private Secretary's "last communication," which had reached McLaren on the preceding day, he made application for a Special Survey in the district known as "The Sources of the Angas River" in lieu of the Survey formerly claimed by Edward Stephens on behalf of the South Australian Company. (30) Whereat the Private Secretary replied politely that His Excellency was glad to find that McLaren had resolved to claim a Special Survey in another district, and thus obviated the disappointment which His Excellency feared must otherwise have inevitably ensued. (31)

And here one would have imagined that the game came to a close: but it was not to be: McLaren, fortified by the support of his legal adviser, was determined to make yet one more effort to curtail Dutton's Mount Barker boundaries: if not the letters, it might be that the combined eloquence of McLaren and Mann might bring the Governor to a more reasonable frame of mind. But, fortunately or unfortunately, the Governor got wind of what was contemplated, and being by this time somewhat out of patience closed the game on a note of sternness. The Resident Commissioner had heard, wrote the Private Secretary, that McLaren and Mann wished to interview him that morning "on the subject of the Special Survey in the Mount Barker District" and desired to inform them "that having given that subject much time and full consideration," he absolutely declined to enter any further upon it. Nothing could vitiate Dutton's claim to the whole of the district for which he had applied, except a mistake in the matter of total area, which could easily be rectified, so soon as the Surveyors had determined whether such error did actually exist. In conclusion McLaren must understand that His Excellency's decision in the matter was final, and from it he did not intend to swerve. (32)

McLaren was beaten and he knew it: but being wise in his own generation, he proceeded to extract what good he could out of defeat. "From the determined tone of his"—the Governor's—last "letter," he wrote to London, "I came to the conclusion that I should gain nothing by contesting the point, and therefore I substituted a contiguous district of the same general character, rich valleys with heavy pasturage, and well watered, including the Stations of Mr. Bourchier, temporarily adapted for cattle runs and dairy purposes. (33)

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(29) Private Secretary to David McLaren, 22nd January, 1839. See also Letter No. 9 in Appendix X.

(30) David McLaren to Private Secretary, 24th January, 1839. See Letter No. 10 in Appendix X.

(31) Private Secretary to David McLaren, 24th January, 1839. See Letter No. 11, in Appendix X.

(32) Private Secretary to David McLaren, 24th January, 1839. See Letter No. 12, in Appendix X.

(33) David McLaren to Edmund J. Wheeler, 26th January, 1839.

APPENDIX VIII.

CONCERNING GERMAN EMIGRANTS.

The following statement is [illegible] from the *Sydney Herald* of 2nd February:

"We publish in another column of this day's *Herald* the copy of an agreement between the Commissioners of the South Australian Company, or 'Bubble' Company, and certain German Emigrants sent out at the cost of the colonists of South Australia by means of their Land Fund. The chief reason we have for placing this document before our readers, is that we may offer a few remarks upon it, illustrating the disgraceful conduct of the present Whig Ministry, as regards this Colony"—*i.e.*, New South Wales—"and of their venal and time-serving character whenever it may suit their purpose. Some two years ago, it was proposed to import into this Colony certain German Emigrants, such as shepherds, vine-dressers, &c., the cost to be paid out of the Land Fund. But the Whigs pronounced a veto upon the proposition, alleging as a reason (and many people agreed with them) that the labouring poor of Great Britain and Ireland who might be disposed to emigrate were more justly entitled to assistance to enable them to do so than foreigners. They therefore prohibited the importation at the public expense of the Germans. Now, we ask why it is that the South Australian Commissioners have been allowed to do the very thing which the colonists of New South Wales would not be permitted to do."

We may explain to our contemporary that the Colonization Commissioners are in no shape identified or connected with the South Australian Company. The latter establishment is a mere private trading company; it is not even chartered, and has no more political connection with South Australia, or with the administration of the Province than the Australian Agricultural Company of New South Wales, or any private merchant in Sydney, has with the Government of Sir George Gipps. The agreement alluded to between the Company and the German Emigrants is a private and a somewhat unhappy speculation of the Company. The German shepherds and vine-dressers are not brought out at the expense of the Emigration Fund; that Fund can only be applied to the emigration of poor British subjects. The Germans in question are not even brought out at the expense of the South Australian Company. The Company only advance the amount of their passage-money and take a bond—strictly enough enforced—for its repayment in the Colony. (¹)

APPENDIX IX.

APPRECIATION OF CAPTAIN D. M. HAHN AS MASTER OF THE SHIP *ZEBRA*.

It affords us, said George Stevenson, most sincere pleasure to be enabled to publish the following gratifying testimony of the care and attention of Captain Hahn, of the ship *Zebra* recently from Hambro' to this country. So much of the comfort and happiness of passengers depends upon the manner in which the Captains of Emigrant ships discharge their important duties, that no opportunity should be lost in testifying the approbation of the colonists where-ever so fitting an occasion shall arise. To the Captain of the *Prince George* and Captain Hahn of the *Zebra* (both with emigrants from Germany) great praise is due for their uniform kindness and attention to those committed to their care, and we would suggest the propriety of the Commissioners granting a premium to those Captains who bring out emigrants and passengers with safety, and whose conduct has been so worthy of commendation.

(¹) *South Australian Gazette and Colonial Register*, 6th April, 1839, page 2, col. 3.

To Captain Hahn of the ship *Zebra*.

Dear Sir, 19th January, 1839.

Taking a lively interest in the subject of emigration to the Australian colonies, and having in our different capacities had considerable experience in this matter, we cannot refrain from expressing our extreme satisfaction on visiting you shortly after your coming to anchor in Holdfast Bay, at witnessing the great friendliness, health and cheerfulness which prevailed among the 180 (2) emigrants brought out by you in the *Zebra*.

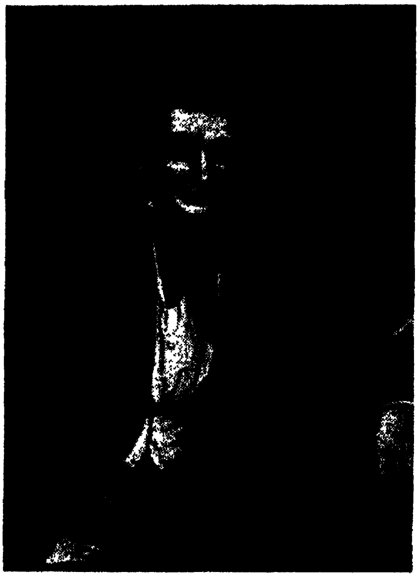
The success with which you have conducted this interesting cargo to these shores, reflects great credit upon you, and we trust it may have the effect of inducing others to follow. We also hope when the great anxiety you have manifested, and the trouble you have taken in the promotion of the welfare of your passengers, after all claims on your attention had ceased by their leaving your ship, shall be made known in Germany, that you will be again selected as the most fit person to be entrusted with a similar duty—one to which so much responsibility attaches, and on the humane execution of which so much of the happiness and comfort of many of our fellow creatures depends.

Be assured of our sincere wishes for your welfare and believe us, dear Sir,

Yours very truly

W. H. Dutton, of Sydney, Merchant and Stockholder.
George Sinclair, Commander Emigrant Ship, *Surrey*.
T. Parsons, late of the Emigrant Ship, *William Metcalfe*.
Charles Flaxman (G. F. Angas' representative in South Australia).
Thomas Young Cotter, Colonial Surgeon. (3)

In an age in which Masters of sea craft were still notorious for brutality, and impatient of any attempt to encroach upon their individual idiosyncrasies, this was a compliment indeed: and although doubtless there were other Masters quite as deserving as Hahn, the majority was very far from being so. George Stevenson, a staunch champion of Hindmarsh, the Governor, was a bitter critic in his diary of Hindmarsh, the Master of the *Buffalo*, whom he accused of utter selfishness and complete lack of consideration for others, and in particular for the unfortunate occupants of emigrant quarters. Colonel Gawler, a most humane man, on his outward journey, wrote long despatches to the Colonization Commissioners describing in detail the intolerable conditions to which emigrants were exposed, and suggested many improvements for future shipments. And later still in January, 1843, the first thing that John Stephens—subsequently the stormy petrel of South Australian journalism—did on landing from the barque *Arab* was to draw up a lengthy indictment against Captain Dalgarno and his wife which was subsequently signed by six cabin and eight steerage passengers, and published as an advertisement in the *Register*. (4) The Captain was accused of attempting to starve his passengers, of sullen taciturnity, abusive language, threats of personal violence, general imcompetence, &c.: whilst of Mrs. Dalgarno



John Stephens (1806—1850). Third Editor of the "Register."
[*Plate 58.*] (*Courtesy Archives.*)

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(2) 190 was given as the number of emigrants that left Hambro', and 189 as the number that reached South Australia, one possibly having died on the way out.

(3) *South Australian Gazette and Colonial Register*, 23rd January, 1839, page 3, col. 1.

(4) *South Australian Register*, 28th January, 1843, page 1, cols. 4, 5, and 6.

it was stated that 'tale-bearing and back-biting appear to have been her almost daily occupation.'' As to the reason that led to the publication of the indictment it was stated:—They could not ''permit that vessel''—the temperance barque Arab—''leave this port without publicly and emphatically expressing their sentiments upon the treatment which they had experienced during the passage: inasmuch as irrespective of all personal consideration they do not desire to be parties to any transaction, which might hereafter subject others to similar insults, annoyance, and impositions. Another, and equally good reason why they deem it right to expose the conduct of Captain Dalgarno to public animadversion, is that they are convinced of the great injury which had already accrued to the cause of emigration by the selection of irresponsible, inexperienced, or incompetent individuals as Commanders of passenger ships in the Australian trade: and they hope by this and other means specially to draw the attention of ship owners, brokers, and agents—and probably the Government itself to this subject.'' ''And this should serve to prove—should proof indeed be needed—that able editors, afloat, ashore, or in the air, at all times should be heeded.''

But Captain Hahn was not a man of that type, and before leaving these shores an honour was done him far exceeding in moral value the laudatory address of a few locally prominent citizens. Those who had benefited from his paternal oversight—and those therefore who *knew* the man *best*—were emigrants, quite without means, and hence unable to give expression to their gratitude by the tender of some token of material value in recognition of what had been done for them. But they did better: instead of seeking in their first settlement in a new land to commemorate some town or village, from which their ancestors and themselves had sprung, they humbly—and let us hope effectively—sought to give imperishable memory to the name of the man who had sheltered and befriended them in what might well have been the days of their tribulation: they called the settlement Hahndorf—the village of Hahn! and let us hope that neither we, nor our descendants, whatever the apparent political provocation will ever lay sacrilegious hands upon a name that commemorated both a ''good man'' and the good that is in mankind.

APPENDIX X.

CORRESPONDENCE BETWEEN DAVID McLAREN, EDWARD STEPHENS, AND THE PRIVATE SECRETARY TO THE GOVERNOR CONCERNING A PROPOSED SPECIAL SURVEY IN THE MOUNT BARKER DISTRICT.

[LETTER No. 1.]

From David McLaren to George Hall, Private Secretary.

15th January, 1839.

I have the honour to state for the information of His Excellency the Resident Commissioner, that as Manager of the South Australian Company I yesterday paid to the Colonial Treasurer £4,000 being the amount of purchase money for a Special Survey of 15,000 acres of land, out of which 4,000 shall afterwards be chosen by me conformably to the Regulations of the Colonization Commissioners for South Australia: and I am prepared to point out a Compact District not exceeding 15,000 acres, in the direction of Mount Barker, to any person whom His Excellency may appoint for that purpose, as soon as I shall learn the boundaries of the land selected by William H. Dutton, Esq. I hope this intimation will be sufficient to secure to the South Australian Company the second choice of a Special Survey in that district; and from the importance of the subject, I am desirous of being honoured with a confirmation of that arrangement from you in the name of His Excellency: I solicit the honour of a communication from you in reply at your very first convenience.

DAVID MCLAREN.

[LETTER No. 2.]

From George Hall, Private Secretary, to David McLaren.

15th January, 1839.

I have the honour to acknowledge the receipt of your letter of this date, which I have submitted to His Excellency the Resident Commissioner, and am instructed to acquaint you, in reply, that the payment of £4,000 into the hands of the Colonial Treasurers fulfils the conditions required by the Commissioners' instructions so far as to entitle you to claim a Special Survey, and to have that Survey made as soon as practicable after the date of payment; but that unless you give such a description of the district which you desire to select, as may be sufficient to enable the Resident Commissioner to identify it, such district cannot be secured to you. Priority of choice must of necessity depend upon priority of description.

GEORGE HALL.

[LETTER No. 3.]

From Edward Stephens, Pro Manager, South Australian Company, to His Excellency the Resident Commissioner.

18th January, 1839.

I have the honour to inform Your Excellency that in virtue of the sum of £4,000 sterling paid into the hands of the Colonial Treasurer on the 14th instant, I require on behalf of the South Australian Company a Special Survey of 15,000 acres of land with its waters, watercourses, and appurtenances in the neighbourhood of the Mount Barker District; and I have the honour to inform Your Excellency that the following are the boundaries of such Survey as nearly as can be at present ascertained; but they will be more minutely pointed out to the Surveyor sent by Your Excellency to survey the same:—15,000 acres at right angles to a line drawn from the opposite bank of the River known by the name of the "Angas" in front of the Joint Stock Cattle Company's dairy, and run by compass about north-east, but so as to pass close by the stations of the Cattle Company, and of Messrs. Fenn, Scott, Jones, and Bourchier and Milne; all of which it is intended to include.

EDWARD STEPHENS.

[LETTER No. 4.]

From George Hall, Private Secretary, to Edward Stephens.

18th January, 1839.

I am desired by the Resident Commissioner to acknowledge the receipt of your letter of this date, and to add that the Survey you require for the South Australian Company is secured as far as it may not interfere with the Survey previously demanded by Mr. Dutton: and that the Survey you require stands fourth upon the present list, namely, after that already offered for by Mr. J. B. Hack of a district upon the Para.

GEORGE HALL.

[Letter No. 5.]

From David McLaren to His Excellency, the Resident Commissioner.

19th January, 1839.

On behalf of the Directors and Trustees of the South Australian Company, I beg leave to adddess Your Excellency on the subject of the Special Survey called for on behalf of the South Australian Company by the letter of Mr. Edward Stephens of the 18th January, instant, and acknowledged in the letter of the Assistant Commissioner, Mr. Hall, of this date. I am happy to find from an interview had with Mr. Hall this morning that the description given by Mr. Edward Stephens' letter is sufficiently explicit for the purpose intended to be effected by it; and in addition thereto I beg to say that my personal knowledge of the country now enables me to add to the definition of the compact district mentioned in Mr. Edward Stephens' letter in the following manner, that is to say: I have to require on behalf of the Trustees and Directors of the Company that the right line to be drawn from the opposite bank of the River known by the name of the "Angas" in front of the Joint Stock Cattle Company's dairy shall in length be and extend and run from the bank opposite to the Joint Stock Company's dairy aforesaid at least five and a half miles in length; and that the direction indicated in the letter of Mr. Edward Stephens, and that the right angles to that line, also mentioned in that letter, shall be and constitute right angles on both the sides of such right lines, and shall at the least include and take in two and a half miles on each side of such right line. This further description of the contents, or part contents, of the compact district or survey of which was called for by the letter of Mr. Edward Stephens is, of course, given with the same reservation as contained in Mr. Edward Stephens' letter, viz., that the boundaries will be more precisely pointed out to the Surveyor to be sent by Your Excellency.

I observe in the favour of Mr. Hall, of the 18th day of January instant, that he states the Survey called for by the South Australian Company is the fourth upon the present list. Allow me to suggest that the order of the Surveys depends not so much upon the time of payment of the money, as it does on the date of the call for the Survey, made on the Commissioner to direct the Survey of a specific compact district not exceeding 15,000 acres.

David McLaren.

[Letter No. 6.]

From George Hall, Private Secretary, to Edward Stephens.

19th January, 1839.

I am desired by His Excellency, the Resident Commissioner, to acquaint you that a sketch of the district of 15,000 acres which Mr. Dutton desires to have surveyed in the Vale of Mount Barker, has been laid before His Excellency this morning; and that it includes part of the district described by you in your letter to His Excellency dated yesterday, viz., the Stations of Mr. Fenn and the Cattle Company. It is not known from what portion of the described district Mr. Dutton will select his 4,000 acres, but you may see the Surveyor's sketch of the 15,000 acres on application at the Survey Office.

George Hall.

[LETTER No. 7.]

From George Hall, Private Secretary, to David McLaren.

21st January, 1839.

In reply to your letter of the 19th instant—Saturday last—I am desired by the Resident Commissioner to state that His Excellency sincerely regrets your disappointment with regard to the limits of the second Special Survey which you have demanded; but that it is not possible for him to interfere with Mr. Dutton's right of prior choice. The district selected by that gentleman, as noticed in my letter to Mr. Stephens of the 19th instant, includes a large portion of the land which you desire to occupy.

GEORGE HALL.

[LETTER No. 8.]

From David McLaren to George Hall, Private Secretary.

21st January, 1839.

I have the honour to acknowledge the honour of your letter of this date, in which His Excellency has, through you, kindly expressed "his regret at my disappointment with regard to the limits of the second Survey which I demanded for the South Australian Company, but that it is not possible for him to interfere with Mr. Dutton's right of prior choice." I beg to return my grateful acknowledgments to His Excellency for his kind consideration and, through you, I beg to state to His Excellency very respectfully yet decidedly that I am convinced that in reference to the selection of the land, described in the application by Mr. Edward Stephens on behalf of the South Australian Company on the 18th January, I have a right of choice prior to Mr. Dutton; and I beg very respectfully to submit to His Excellency the following considerations as forming part of the reasons on which my claim of priority of choice rests:—

First.—That from the conversation which I had the honour of having with you on Saturday, the 19th instant, it appears that the application of Mr. Dutton was for the survey of 15,000 acres in the Mount Barker Valley, including the Cattle Stations of Messrs. Hack and Finnis.

Second.—From your letter to me of date the 15th January instant it is established that unless "such a description of a district" be given "as may be sufficient to enable the Resident Commissioner to identify it, such district cannot be secured," and "that priority of choice must of necessity depend upon priority of description."

Third.—That the description "of 15,000 acres at right angles to a line drawn from the opposite bank of the River, known by the name of the 'Angas,' in front of the Joint Stock Cattle Company's dairy and run by compass about north-east, but so as to pass close by the Stations of the Cattle Company and of Messrs. Fenn, Scott, Jones, Bourchier, and Milne, all of which it is intended to include" was given by Mr. Stephens on behalf of the South Australian Company in his letter to His Excellency the Resident Commissioner of the 18th instant already referred to, previous to any description of that district by Mr. Dutton, or by any person whatever, and that *that* description by Mr. Stephens was admitted by you in conversation with me to be sufficiently explicit.

Fourth.—That from the conversation on Saturday last, repeatedly alluded to, it appears that at that time Mr. Dutton had not given to His Excellency the Resident Commissioner any description of the country which includes the Station

of the Joint Stock Cattle Company, and Messrs. Fenn, Scott, Jones, Bourchier, and Milne; or which in fact can be rightly deemed to include any part of the 15,000 acres, a survey whereof was called for on behalf of the South Australian Company by Mr. Edward Stephens on the 18th instant.

Fifth.—That instead of Mr. Dutton having in terms of the "Regulations for the disposal of land in the Colony" called on "the Colonial Commissioner to direct the Survey of any compact district within the Colony of an extent not exceeding 15,000 acres," he has expressly violated those Regulations and has claimed as appears by a map exhibited in the Survey Office, the Survey of a district considerably exceeding 15,000 acres.

Sixth.—That the district the Survey of which has been so claimed by Mr. Dutton, includes a portion of country, not designated in his original application, which portion of country could not possibly have been identified by His Excellency the Resident Commissioner by any description given by Mr. Dutton; and of which portion of country a Survey was called for on behalf of the South Australian Company, accompanied with a description, acknowledged by you to be sufficiently explicit, previously to that portion of country having been mentioned by Mr. Dutton to His Excellency the Resident Commissioner, either directly or indirectly.

I beg to say that I am not aware of the slightest inaccuracy in the preceding statement, and having entire confidence in the judgment and impartiality of His Excellency the Resident Commissioner, I have not a doubt that His Excellency will come to the conclusion that although Mr. Dutton *may* be entitled to a priority of choice in a Survey of 15,000 acres in the Mount Barker *Valley*, including the Cattle Stations of Messrs. Hack and Finnis; still the boundaries of his Special Survey cannot be allowed to interfere with the boundaries of the Special Survey of the compact district not exceeding 15,000 acres described in Mr. Stephens' letter to His Excellency of the 18th instant, and claimed by him on behalf of the South Australian Company; and including the Stations of the Joint Stock Cattle Company and of Messrs. Fenn, Scott, Jones, Bourchier, and Milne. I have to apologise for the length of this Communication, but ere I conclude I beg to refer to the announcement in the *South Australian Gazette* of the 19th instant of the district "in the neighbourhood of the Mount Barker District" said to be claimed by me for a Special Survey and merely to say that *that* announcement is altogether inaccurate. The description furnished by Mr. Edward Stephens on *18th instant* is the only description which I recognise, with the addition communicated by me in my letter to His Excellency the Resident Commissioner of the 19th instant.

Anticipating a favourable reply to this communication, I have the honour to request that His Excellency will be pleased to direct a Survey of the compact district called for on behalf of the South Australian Company, and to afford to me an opportunity of pointing out to the Surveyor the boundaries thereof.

DAVID McLAREN.

NOTE.—Presumably in anticipation of a lawsuit, which however never eventuated, the official copy of the above letter in the Company's Letter-Book was followed by a special certificate worded as follows:—

"Examined and compared with the original and found correct. Original delivered at Government House under address to George Hall, Esq., Assistant-Commissioner and Private Secretary this 21st day of January, 1839."

D. H. SCHREYVOGEL.

[LETTER No. 9.]

From George Hall, Private Secretary, to David McLaren.

22nd January, 1839.

In reply to your letter of yesterday's date I am desired by the Resident Commissioner to say:—

That in the present state of the knowledge of the face of the country, he cannot in the first instance require minute descriptions of boundaries from individuals demanding Special Surveys. All that he can possibly do is to restrain such individuals to the leading points that they specify. He is decidedly of the opinion that Mr. Dutton has fulfilled this condition, and that he is entitled to the country he demands, if the area of the figure is not more than 15,000 acres. Upon this last point until a precise measurement can be made, he must abide by the opinion of the Surveyor who took over the ground.

All that His Excellency can possibly do in favour of persons who having second choices in Special Surveys, find their ground seriously interfered with by prior selectors, is to allow such persons to waive their claim to the particular district they had wished to take, and to choose another. Such an exchange, in your case, the Resident Commissioner is willing to accede, if you should wish it, but this is the only remedy he can propose.

GEORGE HALL.

[LETTER No. 10.]

From David McLaren to George Hall, Private Secretary.

24th January, 1839.

As Manager of the South Australian Company, I beg to call on His Excellency the Resident Commissioner to order a Special Survey of 15,000 acres, in the district known as the "Sources of the Angas River," being to the northward of the Joint Stock Cattle Company's Station, in lieu of the Survey formerly claimed by Mr. Edward Stephens on behalf of the South Australian Company by his letter of the 18th instant; and agreeably to the permission of His Excellency as intimated in your last communication received by me yesterday.

DAVID MCLAREN.

NOTE.—As was the case for letter number 8, the official copy of letter number 10 was accompanied by a special certificate as follows:—

"Examined and compared with the original and found correct. Original delivered at Government House under address of George Hall, Esq., this 24th day of January, 1839."

D. H. SCHREYVOGEL.

[LETTER No. 11.]

From George Hall, Private Secretary, to David McLaren.

24th January, 1839.

I have the honour to acknowledge the receipt of your two letters of the present date, and am desired by His Excellency the Resident Commissioner to state that His Excellency is glad to find that you have resolved, by choosing another district instead of that originally named by you, to obviate the disappointment which he fears you must inevitably have experienced in the other case.

"Fifteen thousand acres in the district known as the 'Sources of the Angas River,' being to the northward of the Joint Stock Cattle Company's Station" shall be reserved and surveyed for you on account of the South Australian Company; provided, of course, that no part of the 15,000 acres before mentioned shall be included within the boundaries of any district selected prior to the 18th instant; and as soon as a Surveyor shall be ready to mark out the limits of your Special Survey, due notice shall be given you.

GEORGE HALL.

[LETTER No. 12.]

From George Hall, Private Secretary, to David McLaren.

24th January, 1839.

His Excellency the Resident Commissioner having been informed that you and Mr. Mann wished to have an interview with His Excellency this morning on the subject of the Special Survey in the Mount Barker District, desires me to acquaint you that having given that subject much time and full consideration, he must decline entering any further upon it.

Nothing can vitiate Mr. Dutton's claim to the whole of the district which he requires, but a mistake with regard to the area of it; and, if there were such a mistake, it would only oblige him to give up the surplus portion. This point—the area of the described figure shown to you in the Survey Office—Surveyors are now about to determine.

You must understand this to be the final decision of His Excellency from which he will not swerve.

GEORGE HALL.

(To be continued.)

Results of Wheat Crop Competition, 1937

Position.	Name and Address of Competitor.	Variety.	Apparent Yield.	Freedom from Weeds.	Freedom from Disease.	Trueness to Type.	Evenness of Crop.	Total.
		Maxima—	35	25	20	15	5	100
	BUXTON							
	Judged by H. D. M. Adams, District Agricultural Adviser.							
1	Don C. Cant, Kimba	Waratah	34	23½	18½	13½	4½	94
2	L. S. and L. L. Beinke, Kimba	Nabawa and Sword	33	23½	19½	13	4	93
3	H. A. Cant, Kimba	Waratah	32	23½	18½	13½	4½	92
4	Lienert Bros., Buckleboo	Nabawa	30	23½	19½	14½	4	91½
5	G. T. Beinke, Kimba	Sword	32	23	19	13½	3½	91
6	C. R. Clements, Kimba	Waratah	29	24	18½	14	3½	89
7	C. K. Wake, Pinkawillinie	Merridin	30	23	18	13	3½	87½
8	C. G. and G. W. Cant, Kimba	Ranee	28	23	18½	13½	4	87
8	Lienert Bros.	Ranee and Dundee	28	22½	19	14	3½	87
10	A. E. Schaefer, Buckleboo	Merridin	29	23	16	12½	3½	84

Nitrogenous Fertilisers in Relation to Stubble Grown Cereals under South Australian Conditions

[By ALLAN R. CALLAGHAN, D.Phil., B.Sc. (Oxon.), B.Sc.Agr. (Syd.) (Principal), and E. J. BREAKWELL, B.Sc.Agr. (Syd.) (Plant Breeder), Roseworthy Agricultural College.]

Introduction.

The significance of nitrogen as a factor in cereal husbandry has been universally accepted. In beneficial effects of bare fallowing, nitrogen has, to a large extent, usurped the leading role formally held by moisture conservation, so much so as to obscure other beneficial effects of fallowing which research efforts have as yet failed to elucidate. Just as moisture conservation dominated the agricultural vision of bare fallowing protagonists twenty years ago, so nitrogen to-day threatens to dominate and confuse present-day scientific theory with regard to this practice.

Great advances have been made in scientific method and discovery with regard to nitrogen accumulation in the soil and its importance in plant nutrition and, nurtured by unconscious enthusiasm, there has developed a tendency to relegate into relative obscurity benefits of fallowing, practical, or theoretical, other than those associated with nitrogen accumulation and availability. While there can be no denying that lack of nitrogen can be almost as potent a limiting factor in cereal growth as lack of moisture, the "nitrogen complex" must not be allowed to undermine the future mental exercise of research officers or agriculturists, and, above all, it should not be allowed to stilt or obsess the minds of those responsible for the future development of Australian cereal agriculture on a settled and permanent basis.

It has been reasoned, for instance, that artificial nitrogen might conceivably be used on wheat crops and so dispense, to some extent at least, with the need for bare fallowing. The reasoning, from a purely scientific viewpoint, was sound and worthy of trial, but agriculturally its success on the one hand would have undermined the advisory work of the last 50 years, jeopardising faith in bare fallowing, which, as a system and, above all, as a convenience, has contributed so manifoldly to the development of Australia as a great wheat-producing country, and, on the other hand, it would have lent temptation and encouragement to the vice, already chronic, of overcropping.

Fortunately the great advantages of bare fallowing have proved that artificial nitrogen alone cannot assume its mantle, and by general consensus it is agreed that for full returns bare fallowing should precede the wheat crop. It is also generally conceded that liberal applications of superphosphate not only encourage the biological activities in the soil, associated with nitrification, but stimulate the growth of a leguminous flora in leyland which has far-reaching influences on the nitrogen level of the soil.

The incorporation of barley and oats into the wheat land rotations was an agricultural achievement which merely soothed the ruffled countenance of agriculturists who rightly frowned on the idea of growing wheat on bare fallow in unbroken sequence. The fact that both oats and barley were regarded as stubble crops, especially oats, meant that their place in the rotation was merely a case of "robbing Paul to pay Peter," and logically the effects of such a system would first be reflected in the stubble crop. This is exactly what has taken place, and even where the phosphate level has been maintained by unstinted applications of superphosphate there has been a marked deterioration in the general health and vigour of stubble crops, and unquestionably the primary cause of debilitation, expressed in poor colour and spindly growth, and frequently accompanied by eel-worm infection, has been nitrogen starvation. This is not to be wondered at, when it is considered that the preceding wheat crop, as a rule, has been very exhausting on available nitrogen. *There are two main approaches to the problem of cereal stubble crops, one is to supplement the obvious lack of nitrogen by the application of artificial fertiliser, and the other is to look the practice sternly in the face and pronounce it agriculturally unsound. While the first is likely to act as a temporary palliative and satisfy the immediate requirements and inclinations of the farmer, and incidentally involve a much wider market for the sale of nitrogenous fertilisers, it is also encouraging more rapid soil impoverishment per medium of the veiled iniquity of overcropping. Agriculturally the problem demands that stubble-cropping with cereals should be reduced to a minimum; this does not infer that oats or barley, or both, sown for grazing, and grazing alone, should be classed as cropping. Rather it presents an avenue of approach, for coupled with the more universal use of leguminous crops, such as peas, the use of oats and other suitable pasture species for grazing will sponsor more universal use of livestock, especially sheep, on the farm, and automatically widen the cropping rotation.*

Even if the work reviewed herein encouraged greater faith in the use of sulphate of ammonia as a means of increasing the yields of stubble crops it would be exceedingly dangerous, in the opinion of the writers, for such a practice to become a doctrine for dissemination through the extension services of the country, simply because, to the discerning eye, the insidious effects of overcropping are already apparent on the landscape of Australia's wheat lands. This subject has been dealt with by Callaghan in a recent article (1), and it is one which concerns practically the whole of the true wheatgrowing regions of Australia.

The results which have accrued from an Australian wide and somewhat intensive campaign to establish a case for the use of sulphate of ammonia for stubble crops have been very variable, as might be expected from the great variability of soil, rainfall, and climatic conditions under which the experiments have been conducted. Just as the results have been variable, conclusions have been variable, and, sad to relate, contradictory, but the opinions of those obtaining favourable results, like the opinions of all those who carry good news, have been given the greater credence, the greater publicity, and have received additional impetus and applause from commercial interests. The outcome has been a wave of interest, on the part of farmers, in the use of sulphate of ammonia. That the enthusiasm of the farmer has already waned, however, lends support to the less spectacular results which indicated that, on the majority of wheat land soils, and under the truly typical wheat land rainfall and climatic conditions, sulphate of ammonia was not likely to be an economic propostion.

With the object, therefore, of clarifying the position and acquainting farmers with the results for and against, and, at the same time, discussing them from the point of view of agricultural policy, the results obtained at Roseworthy Agricultural College, from experiments with sulphate of ammonia over the last four years, are given herein, against the background of a review of published results obtained by other organisations in Australia. To quote the College results, as such, would only add to the confusion already existent: for this reason a bold attempt is made to deal in a general way with the problem and acquaint the rural worker with the facts, and perhaps fancies, as they appeal to the writers.

History of the Use of Nitrogenous Fertilisers in the Australian Wheat Belt.

Before the beginning of the present century phosphate had been definitely proved indispensable to the growth of good cereal crops, and farmers had accepted the idea of superphosphate, and were in a fit frame of mind to be convinced of the usefulness of any artificial fertilisers that might be advocated as a result of successful experimentation. Nitrogenous manures had been tried, but were regarded to be of little or no value. Perkins (²), writing in 1906, stated that the failure of these manures, usually looked upon in other countries as essential to the good growth of cereal crops, was generally attributed to the fact that nitrification was encouraged to such good effect on well-cultivated fallows that to supply nitrogen to the soil was tantamount to taking coals to Newcastle. Lawes and Gilbert had, as early as 1855, established the fact that one of the chief benefits of bare fallowing was to raise the nitrogen content of the soil. This the early experimenters recognised, and in undertaking the first properly-conducted experiments with nitrogenous fertilisers in South Australia, Perkins proclaimed his awareness of this fact, and, at the same time, announced that although he did not wish to challenge the validity of current opinions on the subject at the time he regarded it to be of sufficient importance to warrant systematic trial. As a result, work was commenced at Roseworthy Agricultural College in 1905, using Nitrate of Soda and Sulphate of Ammonia, in association with superphosphate, on wheat grown on bare fallow and on wheat grown on wheat stubble. Unfortunately, but very significantly, the continuous wheat plots were abandoned after three years, because of the absolute inability to deal adequately with the area (32 acres) from the point of view of good tillage and weed control. Perkins and Spafford (³), in a final report on this trial, emphasised the fact that bad tillage, whatever the season and whatever the nature and quantities of manures used, will invariably lead to poor crops. The results obtained with Nitrate of Soda, on the one hand, and Sulphate of Ammonia, on the other, did not give payable returns. In the second report on the experiment it was pointed out by Perkins (⁴) that the average grain yield of the plots preceded by bare fallow in 1906 was represented by 19bush. 18lbs., while the average grain yield of plots on which wheat followed wheat, notwithstanding heavy manuring (in which Nitrate of Soda and Sulphate of Ammonia figured largely) did not exceed 8bush. 10lbs.

A long-range view of the results from nitrogenous fertilisers on wheat grown on fallow, and commenced in 1905 by Perkins, is given by Birks and Cole (⁵) in the report on the experiments published in 1928. Over the 23 seasons reviewed therein it is noted that the mean increase from 1cwt. of Nitrate of Soda, added at seeding time on wheat grown on fallow, was 1bush. 44lbs., and from 1cwt. of Nitrate of Soda, added to the crop in spring, the mean increase was 1bush. 24lbs.; in neither case was the increase payable. More significant still was the fact that only on four occasions during the 23 years had the nitrogenous applications paid, whereas on six occasions the results obtained were worse as a result of the application of Nitrogen.

In 1929 Scott and Smith (⁶) gave a report on nine years of experimental work, conducted at Veitch, South Australia, with superphosphate and Nitrate of Soda applied at the rates of 1cwt. and ½cwt. respectively on both wheat and barley grown on fallow. The mean results for the nine years on wheat showing a negligible, and probably insignificant, increase of 12lbs. wheat per acre, while the mean yield of barley was depressed from 20bush. 27lbs., obtained with superphosphate alone, to 18bush. 45lbs. with both superphosphate and Nitrate of Soda.

The best increases noted with wheat grown on fallow soils in South Australia were obtained at Booborowie and reported on by Bristow (7), where ½cwt. of Nitrate of Soda, in conjunction with superphosphate, was responsible for an increase in the mean, covering the 11 years 1916-27, of 2bush. 47lbs.

Similar experiments have been conducted in other States, one of the most noteworthy being at Cowra Experimental Farm (8), situated in typical wheat-growing country, where, over a period of four years, the increase in the stubble crop, due to the application of 60lbs. of Sulphate of Ammonia, was negligible. Comparable results had previously been obtained by Peacock at Bathurst Experiment Farm (9).

In Victoria, Howell (10) reported an increase in stubble crops, due to Sulphate of Ammonia. In the seasons 1902 and 1903 hay increases of 5.4cwts. and 4cwts. resulted from the application of 1cwt. of Sulphate of Ammonia, these figures being the average from 50 fields in Southern Victoria.

Whilst the results from wheat grown on fallow do not help much in the matter under review those from stubble crops are very significant, and it is peculiar that they should have been overlooked by modern investigators, indicating, as they do, that nitrogenous fertilisers had been tried on stubble crops at several centres in Australia in the first decade of this century and, in most instances, found to be superfluous. They also indicate that the modern onslaught on nitrogen as a fertiliser for cereal crops, under Australian conditions, is by no means original.

The chief contributory causes to the renewed wave of experimentation with nitrogenous fertilisers on cereal crops have been firstly, and primarily, the reduction in cost of the fertilisers, due to modern synthetic methods of production and, secondly, to very apparent effects of cereal sickness frequently evident on overcropped areas in the settled districts.

Recent Australian Experiments with Sulphate of Ammonia.

An extensive series of experiments has been conducted by the Waite Institute, South Australia, in which the effects of Sulphate of Ammonia on stubble-sown wheat, oats, and barley, have been investigated under the particular conditions prevailing at the Institute. The results from these trials have been published in two reports issued by Richardson and Fricke (11), and Richardson and Gurney (12). The first report, by Richardson and Fricke, covers results obtained on stubble-grown wheat, and increases in grain yields of 3.16bush., 5.39bush., and 9.13bush. obtained from dressings of ½cwt., 1cwt., and 2cwts. per acre of Sulphate of Ammonia were reported. The wheat tests were conducted from 1928-32, and in 1933 experiments were begun with barley and oats, which represent the usual cereal stubble crops of South Australia. The results obtained were phenomenal, and they bear witness to the fact that, under certain conditions, the use of Sulphate of Ammonia on stubble-sown cereal crops may prove highly profitable. However, no increases of anything like the same magnitude have been obtained in the wheat belt proper; this in itself indicates that the whole problem must be approached cautiously, and all special circumstances and conditions given due credence and comparative consideration. At the Waite Institute the increases reported for barley were 8bush., 17bush., 29bush., and 35bush., brought about by the application of ½cwt., 1cwt., 2cwts., and 3cwts. per acre of Sulphate of Ammonia, and the plot receiving 3cwts. averaged 61.96bush. for the years 1933 and 1934. With oats the respective increases from the same range of treatments were 9bush., 19bush., 34bush., and 39bush., and the oat plots treated with 3cwts. of Sulphate of Ammonia averaged, for two years, 80.32bush. per acre.

The high yields recorded are evidence that other limiting factors, so common in the wheat regions proper, were not operating.

The scientific import, and the highly profitable nature of the results obtained by Richardson and Gurney at first seem to provide conclusive evidence for the immediate and unequivocal recommendation of Sulphate of Ammonia where stubble-sown cereals are grown, and it is not surprising, therefore, that the writers, without the results of work conducted since on more typical wheat land conditions to guide them, should conclude that "most striking and profitable increases in yield are obtained from these crops (*i.e.*, stubble-sown crops) with nitrogenous fertilisers." In the light of subsequent work herein reviewed and reported, a generalisation so sweeping is impossible; the problem has now been found to be far more recondite, and needs careful and judicious handling by the extension services.

The University of Melbourne has reported on an extensive set of trials at 18 different localities in Victoria and Southern Riverina in New South Wales, and covering a wide range of climatic and soil conditions (18). In spite of the latter, only in five localities was the rainfall below 20in., and only in one of these was it below 17in., and soil reactions were acid with two exceptions. At this juncture it is interesting to note that by far the greater proportion of the South Australian wheat belt is situated outside the line of 20in. rainfall, and has soils generally ranging from neutral to strongly alkaline. The results obtained by the Melbourne University lend substantial evidence to the value of Sulphate of Ammonia on stubble-grown cereals in areas of good rainfall and on acid soils, for from 1cwt. of Sulphate of Ammonia profitable returns were obtained in all cases, except on the plots at one centre, Clarkeville, where waterlogging led to failure of the trials, and at another, Dumosa, where the rainfall was only 14½in. and the soil was alkaline and typical of mallee country. In the report, special mention is made of the latter result as it was obtained on the only alkaline soil in the series, and failure to respond to Sulphate of Ammonia is attributed to the fact that the nitrate nitrogen content of the surface 9in. of soil was 20.6 parts per million at the time of planting the plots. This figure is equivalent to 2½cwts. of Sulphate of Ammonia per acre, and compares favourably with figures for fallowed land at the Waite Institute quoted by Richardson and Fricke, namely, 26.7 parts per million, whereas at five other localities in the Melbourne University trial the range of nitrate nitrogen in the surface 9in. of soil at seeding was from 1.8 to 4.3 parts per million. Richardson and Fricke report 7.6 parts per million on stubble soil at the Waite Institute.

The summary made in the report published by the University of Melbourne, indicates that there is every evidence that Sulphate of Ammonia on stubble-grown cereals is a payable proposition under existing farming conditions in localities receiving relatively high annual rainfall, while the failure at Dumosa, which is of especial interest from a South Australian viewpoint in the fact that it represents fairly typical mallee conditions, was attributed to the warm climate and a low rainfall during the growing period of the crop. In certain cases paddock history has been mentioned in the report, but unfortunately it has not been made a special feature. Where it has been mentioned, the evidence is that serious overcropping preceded the work with Sulphate of Ammonia. For example, at Leopold the trials themselves represented the eleventh successive cereal crop. Curiously enough, and significantly so from the agricultural point of view, the results of the trials at this centre were nullified by eelworm and excessive weed growth, two of the most natural corollaries of poor farming.

Trials conducted by the Victorian Department of Agriculture substantiate the results obtained since 1933 by the University of Melbourne. Experiments were conducted on the various State experimental farms, and responses to Sulphate of Ammonia were experienced at Werribee (14) and Rutherglen (15). At Dookie a small and barely significant response was received from ¾cwt. of the 2 and 1 mixture, but not from the other mixtures. Trials in Southern Victoria (16) have shown that the application of Sulphate of Ammonia to stubble crops gives payable increases, but in the same article it is stated that results are not so promising in Northern Victoria, that is, in the drier and more alkaline zones. This is substantiated by the experiments conducted at Walpeup Mallee Research Station (17) where only very slight and unprofitable increases resulted from the application of nitrogenous fertiliser.

In addition to the trials conducted at the Waite Institute, the South Australian Department of Agriculture has investigated the problem at several centres, while Nitrogen Fertilisers, Pty., Ltd., have also contributed by well-conducted trials throughout the country. In view of the more intimate relation of results from the Roseworthy Agricultural College experiments with other South Australian experience, reference to the latter will be more appropriate in the general discussion on the results obtained from the College trials.

Trials Conducted at Roseworthy Agricultural College.

Environment.

The Roseworthy College farm is situated in an area of typical limestone mallee country with an annual rainfall of 17.40in. with a regular and reasonably reliable winter rainfall. An outstanding feature of the environment, and characteristic of much of the wheat lands of South Australia, is the shortness of the cereal season associated with an extremely sharp change to warm dry conditions in the spring normally exaggerated by hot, dry, northerly winds. This brings about a rapid finish to the life of cereal crops, and it is only when unusually favourable spring conditions are experienced that the crops escape slightly premature desiccation. Under such circumstances, any increased tillering and vegetative growth is likely to delay maturation and actually prejudice the grain yield of such crops.

The farm has been farmed for many years now on the lines of reasonably broad rotations, and superphosphate has been applied liberally. For wheat, the normal rotation has been pasture, fallow, wheat, broken in one or two paddocks each year by the interpolation of oats or barley as stubble crops or preceded by peas. There is no doubt that the soil is in good heart as excellent response is obtained from good fallowing methods. Further, the pasture or leyland flora is dominated by medics, chiefly *Medicago denticulata* and *Medicago tribuloides*.

The soils are light, friable loams of limestone origin and of alkaline reaction (pH 7.8).

In many respects the country, rainfall, and climate are typical of large areas of the South Australian wheat belt, but the farm differs from many farms of similar age in that evidence of overcropping is lacking. Actually the farm is considerably more productive and in better heart than it was when first taken over by the College some 50 years ago, chiefly because of the settled policy of combining livestock husbandry with cropping, which has placed the College farming on a permanent basis. *Country in good heart, farmed judiciously in combination with livestock pursuits and liberally supplied with phosphate in typical Australian wheat land environments and especially on alkaline soils, should be able to "grow" its nitrogen in available and generous quantities sufficient to alleviate the need of calling on artificial supplies, and this argument is largely substantiated by results at present being obtained from the College Farm.*

The trials reported herein were conducted in 1933, 1935, and 1936 on land previously cropped to wheat grown on fallow, and the bare fallow was prepared from pasture the previous year. The 1934 trials were sown on an oat stubble, the oats having been grown on fallow; here again the fallow was prepared from pasture. So that in all four years the experiments were on land which had come through the rotation, wheat, pasture, fallow, fallow-crop; in other words the stubble crops grown for the trials represented the third crop in five years. The 1935 trials were in a paddock (Crouch's D) which was purchased by the College in 1928, and prior to purchase it had been subject to frequent cropping with the result that the paddock in 1935 was not in such good heart as those on which the trials were situated in 1933, 1934, and 1936.

The rainfall for the years under consideration was variable. In 1933 the rainfall of 16.85in. was below average, and of this 12.61in. fell during the growing period April to October inclusive. In 1935 the recording of 18.49in. was an inch above the average, and 14.67in. fell during the growing period. The 1936 rainfall was very low at 13.15in., and of this 9.22in. were recorded during the period from April to October inclusive.

Methods.

In all years each treatment was replicated at random five times throughout the trial. In 1933 plots were one-tenth of an acre in size to permit the assessment of both hay and grain yields, in 1934 and 1935 they were one-twentieth of an acre, and in 1936 one-fortieth of an acre after the headlands had been cut.

Normal rates of seeding were employed, viz., 65lbs. barley and 50lbs. of oats. Grain plots were harvested with a stripper and winnowed *in situ.*

Yields of green fodder were assessed by cutting 20 quadrats of 1 sq. yd. at random from each plot immediately before grazing, and weighing the 20 cuts in bulk.

ROSEWORTHY AGRICULTURAL COLLEGE.

TABLE I.—*Results from Trials with Sulphate of Ammonia on Stubble Sown Crops.*

1933 Prior Barley.

Treatment per Acre.	Grain.				Hay.					
	Yield per Acre.		Difference from Standard.		Yield per Acre.			Difference from Standard.		
	Bush.	Lbs.	Bush.	Lbs.	T.	C.	L.	T.	C.	L.
No manure	28	15	—		1	19	0		—	
1cwt. superphosphate	27	24	—		1	19	35		—	
1cwt. sulphate of ammonia	25	44	−1	30	2	0	82	+0	1	47*
1cwt. super, ½cwt. sulphate of ammonia	26	33	−0	51	2	0	41	+0	1	6*
1cwt. super, 1cwt. sulphate of ammonia	21	42	−5	32*	1	18	75	−0	0	72
1cwt. super, 1½cwts. sulphate of ammonia	18	19	−9	5*	1	15	102	−0	3	35*

S.E. = 5·6 per cent. for grain, 3·0 per cent. for hay.

Significant difference = 140lbs. grain per acre.

Significant difference = 264lbs. hay per acre.

* Differences significant from standard.

1933 Early Kherson Oats.

Treatment per Acre.	Grain.				Hay.					
	Yield per Acre.		Difference from Standard.		Yield per Acre.			Difference from Standard.		
	Bush.	Lbs.	Bush.	Lbs.	T.	C.	L.	T.	C.	L.
No manure	29	21	—		2	2	63	—		
1cwt. superphosphate	30	36	—		2	6	17	—		
1cwt. sulphate of ammonia	33	25	+2	29	2	10	15	+0	3	110*
1cwt. super, ½cwt. sulphate of ammonia	36	2	+5	6*	2	14	39	+0	8	22*
1cwt. super, 1cwt. sulphate of ammonia	35	29	+4	33*	2	15	60	+0	9	43*
1cwt. super, 1½cwt. sulphate of ammonia	33	37	+2	31	2	10	54	+0	4	37*

S.E.=4·2 per cent. for grain, 2·8 per cent. for hay.

Significant difference, 112lbs. per acre for grain.

Significant difference, 320lbs. per acre for hay.

* Differences significant from standard.

1934 Prior Barley.

Treatment per Acre.	Grain.			
	Yield per Acre.		Difference from Standard.	
	Bush.	Lbs.	Bush.	Lbs.
No manure	33	29	—	
1cwt. superphosphate	34	29	—	
1cwt. sulphate of ammonia	37	42	+3	13*
1cwt. super, ½cwt. sulphate of ammonia	37	7	+2	28*
1cwt. super, 1cwt. sulphate of ammonia	33	40	−0	39

S.E., = 2·3 per cent. Significant difference = 81lbs. per acre.

* Differences significant from standard.

1936 Early Kherson Oats.

Treatment per Acre.	Grain.			
	Yield per Acre.		Difference from Standard.	
	Bush.	Lbs.	Bush.	Lbs.
1cwt. superphosphate	11	12	—	
1cwt. sulphate of ammonia	9	24	−1	28*
½cwt. super, ½cwt. sulphate of ammonia	11	28	+0	14
1cwt. super, ½cwt. sulphate of ammonia	10	36	−0	16
1½cwt. super, ½cwt. sulphate of ammonia	9	32	−1	20*
1cwt. super, 1cwt. sulphate of ammonia	10	36	−0	16

S.E. = 5·8 per cent. Significant difference = 25lbs. per acre.

* Differences significant from standard.

From a summation of the results and after allowing the cost of Sulphate of Ammonia at 12s. per cwt., the value of barley grain at 3s. per bushel and oats at 2s. per bushel to the farmer, Table 2 has been prepared to show the profit or loss per acre due to the application, at varying rates, of Sulphate of Ammonia under Roseworthy College conditions for the seasons 1933, 1934, and 1936.

ROSEWORTHY AGRICULTURAL COLLEGE.

TABLE II.—*Summation of Results obtained from Trials with Sulphate of Ammonia on Stubble Sown Crops.*

Barley.

Treatment.	Difference in Yield from Standard.						Cost of Nitrogenous Fertiliser.		Profit or Loss Due to Sulphate of Ammonia.	
	1933.		1934.		Total.					
	Bush.	Lbs.	Bush.	Lbs.	Bush.	Lbs.	s.	d.	Per Acre. s.	d.
1cwt. super, ½cwt. sulphate of Ammonia	−0	41	+3	13	+2	22	12	0	−5	0
1cwt. super, 1cwt. sulphate of ammonia	−5	32	+2	28	−3	04	24	0	−33	0
1cwt. super, 1½cwt. sulphate of ammonia	−9	05	—		−9	05	18	0	−45	0
1cwt. sulphate of ammonia only	−1	30	−0	39	−2	09	16	0	−22	0

Oats.

Treatment.	Difference in Yield from Standard.						Cost of Nitrogenous Fertiliser.		Profit or Loss Due to Sulphate of Ammonia.	
	1933.		1936.		Total.					
	Bush.	Lbs.	Bush.	Lbs.	Bush.	Lbs.	s.	d.	Per Acre. s.	d.
1cwt. super, ½cwt. sulphate of ammonia	+5	06	−0	16	+4	30	12	0	−2	6
1cwt. super, 1cwt. sulphate of ammonia	+4	31	−0	16	+4	15	24	0	−15	3
1cwt. super, 1½cwt. sulphate of ammonia	+3	31	—		+3	31	18	0	−10	6
½cwt. super, ½cwt. sulphate of ammonia	—		+0	14	+0	14	4	0	−3	3
1½cwt. super, ½cwt. sulphate of ammonia	—		−1	20	−1	20	8	0	−5	0
1cwt. sulphate of ammonia only	+2	29	−1	28	+1	01	16	0	−14	0

The best response to Sulphate of Ammonia was experienced in 1935. The trials in that year were sown on land which, as already stated, had been subjected to more regular cropping than the paddocks on which the trials in other years were conducted. Algerian oats were used, and grazed twice, cuts being taken to estimate the bulk of greenfeed on each plot before grazing. Unfortunately, after the second grazing, a dry spell was experienced and the soursob (*Oxalis cernua*) in the paddock gained the ascendancy and smothered out the oats necessitating the abandonment of the trial.

Results from the grazing cuts in this year are given in Table 3:—

ROSEWORTHY AGRICULTURAL COLLEGE.

TABLE III.—*Results from Two Cuts of Stubble Grown Oats, Dressed with Sulphate of Ammonia, taken at the Time of Grazing,* 1936.

Treatment.	First Cut 26th June.	Second Cut 22nd July.	Total Two Cuts.	Increase over Standard.
	Cwts. per Acre.	Cwts. per Acre.	Cwts. per Acre.	Cwts. per Acre.
No manure	6·8	7·5	13·3	—
1cwt. superphosphate	8·1	9·1	17·2	—
1cwt. sulphate of ammonia	10·1	11·5	21·6	4·4
1cwt. super, 1cwt. sulphate of ammonia	12·8	16·0	28·8	11·6
1cwt. super, ½cwt. sulphate of ammonia	10·9	12·2	23·1	5·9
1½cwt. super, ½cwt. sulphate of ammonia	10·9	10·5	21·4	4·2

S.E. of first cut = 4·6 per cent. S.E. of second cut = 5·3 per cent.

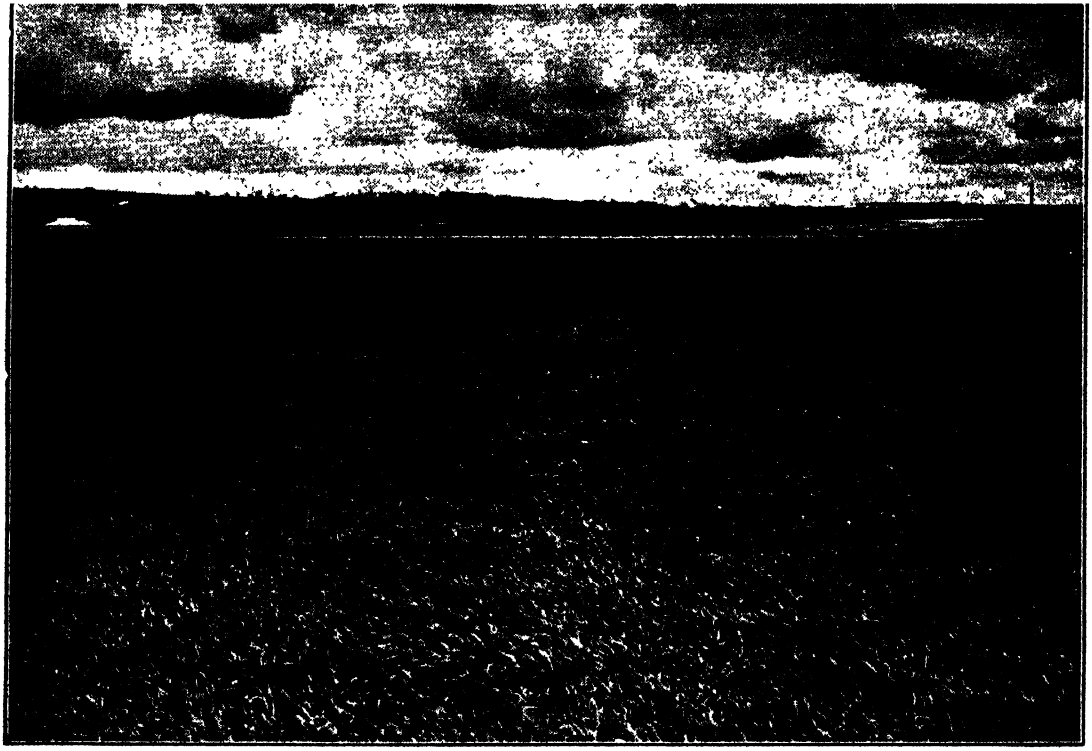
This flush of early growth is usual with oats which have received dressings of Sulphate of Ammonia, particularly when they are sown on land which has been overcropped. Had the season been favourable, there was every indication, judging by the vigour of the growth, that the plots receiving Sulphate of Ammonia would have outyielded those receiving superphosphate alone. From the above results, and observations on the other trials, it is evident that the best returns from Sulphate of Ammonia are obtainable from the vegetative parts of the plant, and, in the South Australian wheat belt particularly, increased returns of hay or greenfeed are much more probable than are increased returns of grain. In this connection a payable return of oaten hay was obtained in 1933, when a net income of 8cwts. for an outlay of 6s., representing the cost of the Sulphate of Ammonia, was obtained, and on this basis, in specific years, increased hay yields may be anticipated. The problem is to pick the specific year.

With oats for grazing the position is somewhat difficult in that nitrogen assimilation is most rapid during the early life of the plant. Grazing actually removes the nitrogen already assimilated, and the plant is required to recover on depleted nitrogen supplies. It is apparent, however, from the 1935 grazing results tabulated above that there is an increase of bulk in the second cuts from plots treated with nitrogenous fertiliser, and probably reflects the advantage of deeper and more rapid early root development orginally encouraged by the more favourable early environment of the plants. In spite of the flush of early growth induced it is doubtful whether sufficient extra grazing is obtainable to cover costs.

Discussion of Results.

Trials conducted by the South Australian Department of Agriculture and by Nitrogen Fertilisers, Pty., Ltd., with Sulphate of Ammonia in the higher rainfall areas have given results which are in general agreement with the Victorian series, and under conditions of relatively high rainfall, 20in. per annum or over, responses to nitrogenous fertiliser have been common.

On Kangaroo Island and in the South-Eastern districts notable increases in yield were obtained. In lower rainfall areas, however, such as Lower Eyre's Peninsula, Yorke Peninsula, Mid-North, and Central districts, the results are somewhat conflicting, while negative results were common in drier portions of these districts and other similarly situated divisions such as the Upper North and Murray Mallee. Evidence of the variable results and of the fallacy of placing too full reliance on one year's set of figures is available from the fact that in the year 1934, increases obtained with oats and barley respectively, following the application of 1cwt. of Sulphate of Ammonia, were 18bush. and 12bush. on plots at one centre in the Central districts. The yields for the plots which received only 1cwt. superphosphate were 6.3bush. and 4.6bush. for oats and barley. On similar plots at Roseworthy College, however, the yield of oats from the plots receiving only 1cwt. of superphosphate was 34bush. and the increase brought about by the application of 1cwt. of Sulphate of Ammonia in addition to the superphosphate was only 2.5bush. It might be mentioned that the College plots were on a soil typical of the district, and received approximately the same rains as did the plots under review, being relatively close to them. Obviously, then, the poor yields of the stubble crops and the relatively large response brought about by the application of Sulphate of Ammonia in the experiment quoted (^{17}) were either due to radically inferior rotational methods in the past or to unusual soil conditions. *Paddock history and soil type are all-important in the analysis of results.*



A typical example of patchy growth in a stubble crop, due to overcropping. Evidence of this nature shows up first in stubble crops, but with continued overcropping similar irregularity asserts itself even on fallowed land. The corrective is to widen the rotation and crop less frequently.

Even in the higher rainfall areas negative results are not uncommon, particularly where the land has previously carried a good cover of Subterranean clover.

Trials at Aldinga and McLaren Vale, which are two important barley-producing centres, have shown that a response to the fertiliser may be obtained.

At the same time it is significant that the use of Sulphate of Ammonia throughout these districts has not become as popular as one would expect, in spite of outstanding returns obtained in specific instances ([18]). In fact, where peas enter into the rotations so markedly as they do with the better-class farmers of this district it is doubtful whether response to nitrogenous fertilisers would be payable.

In parts of the higher rainfall belt where cropping is somewhat sporadic, paddock history appears to be important, for results on stubble-sown areas are conflicting. In the areas receiving 16-20in. of rain good farming methods should obviate the necessity for the use of the fertiliser on normal soils, and it is a decidedly risky proposition to use the fertiliser in the districts receiving less than 16in., for the rainfall is not sufficiently reliable.

It is on the smaller holdings, however, in the higher rainfall areas where the land is, by necessity, heavily cropped, that the use of Sulphate of Ammonia becomes essential if maximum returns are to be obtained. Such holdings are common in the more Southern and Western districts of Victoria, but they are relatively rare in South Australia as most of the higher rainfall country is devoted to grazing. Whilst overcropping and narrow rotations are lamentable, it is outside the scope of this paper to suggest remedies. Fortunately the soil is generally of such a nature that it should not quickly suffer ill effects from overcropping, provided artificial fertilisers induce responses, though this policy must inevitably prove to be detrimental to the land over a period of years. For the present, however, the economic position of the farmer must be considered, and since responses to Sulphate of Ammonia under the higher rainfall conditions are generally payable the use of the fertiliser will undoubtedly increase immediate returns.

The results obtained from the 1933 and 1934 trials at the College were so greatly at variance with those obtained at the Waite Institute and other higher rainfall areas that an interim report was considered desirable, and because of the importance of the question an explanation for the discrepancy between the figures obtained at the College and those from other centres, such as the Waite Institute, was attempted therein; Callaghan and Breakwell ([19]). In the course of discussion on the problem the following statement was made by the writers:—

"Owing to the regular use of superphosphate, pastures rich in legumes and with a high carrying capacity have been built up; consequently the general fertility level in the soil is higher in every respect, and it is not to be wondered at that the application of Sulphate of Ammonia fails to produce those startling results which have been obtained on soils in not such good heart, which are virtually low in available as well as potential nitrogen.

"It has been proved beyond doubt that the yielding ability and carrying capacity of the farm can be built up by the liberal use of superphosphate, livestock, and judicious cropping, and this is the policy which has been advocated by the College, and will be advocated in the future unless, of course, later work and results lend greater agricultural significance to the use of nitrogenous fertilisers on the stubble crops of the main wheatgrowing areas."

Observations of the effect of Sulphate of Ammonia at different localities throughout the State, conversations with farmers and agricultural authorities, and investigations into the paddock histories on some of the properties at which responses to the fertiliser were obtained, have only strengthened the conviction conveyed by the above opinion.

It appears that Sulphate of Ammonia is less likely to give payable returns on alkaline soils in low rainfall areas. In specific instances (18), profitable increases may be obtained on typical Mallee soils by the use of Sulphate of Ammonia, but the general consensus of opinion amongst up-to-date farmers and agricultural advisers alike, is that such responses are usually associated with either new, or overcropped and badly-managed lands, and should not be taken as indicative of the wheat belt generally.

Conversations with agriculturists and District Advisers and examination of official and unofficial trials with the fertiliser carry the conviction that any policy which advocates the use of Sulphate of Ammonia in the major portion of the South Australian wheat belt is not only unsound but is also prejudicial to the evolution of sounder farming methods.

Factors Affecting the Nature of Response of Stubble Crops to Sulphate of Ammonia.

1. Rainfall.

It is generally conceded that the higher the rainfall, within limits, the greater will be the response of stubble crops to Sulphate of Ammonia. The reason behind this contention is that to make adequate use of the nitrogen supplied, there must be sufficient moisture available to permit reasonable crop growth.

On soils deficient in nitrogen, there will be a greater response to heavy dressings of Sulphate of Ammonia in years when the rainfall is adequate and well distributed.

Moisture, however, may not necessarily be a limiting factor to response from nitrogenous fertilisers, for soil condition may frequently have precedence over rainfall as a limiting effect. For example, at Yeelanna (S.A.) in 1935, the following results were obtained from experimental plots:—

Barley.

Treatment	1cwt. super —	1cwt. super ½cwt. sulphate of Ammonia	1cwt. super 1cwt. sulphate of ammonia	1cwt. super 2cwt. sulphate of ammonia
Yield (bush.)	49·5	49·7	50·0	50·0

In 1936 on a different property, the results were :—

Barley.

Treatment	1cwt. super —	½cwt. super ½cwt. sulphate of ammonia	1cwt. super ½cwt. sulphate of ammonia	1cwt. super 1cwt. sulphate of ammonia
Yield (bush.)	15·7	20·7	20·5	26·8

In 1935 the rainfall at Yeelanna was average, and in 1936 below average. If moisture had been a limiting factor, one would have expected the higher responses to have been obtained in 1935. 'It is assumed that either the soil conditions or paddock history on the two properties at Yeelanna were vastly different, and considering the comparative youthfulness of the district the former is the more likely cause of the difference.

A perusal of the results obtained at Roseworthy College, over a period of three years, the trials being conducted on similar soil types each year, demonstrates that the magnitude of the response does not fluctuate significantly with the rainfall.

Incidence of rainfall is important. Good early rains cause a flush of growth in crops which have been manured with Sulphate of Ammonia. If the fertiliser is not applied this strong early growth is not so apparent, even when the nitrate level of the soil is high. The reason for this is that, in the first instance, the young plants have at their disposal a large supply of readily available nitrates, since the Sulphate of Ammonia is drilled in with the seed. In the second instance however, although there is a high nitrate level in the soil, the plants can only assimilate the nitrates slowly, as they are distributed evenly throughout the soil. The growth is slower but "harder." The difference in the vigour of the two plots is frequently apparent until heading; after that period the crop which received no Sulphate of Ammonia makes up and to a large extent overcomes the advantages gained during the early life of the crop treated with nitrogenous fertiliser. If finishing conditions are dry and severe, as they often are in the South Australian wheat belt, the softer growth of the latter will suffer, resulting in fluffy hay and reduced grain yields. Such was the experience at the College in 1933. Had the finish not been severe the plots receiving heavy dressings of Sulphate of Ammonia would have returned higher yields, though not sufficiently high to warrant the extra expenditure on the nitrogenous fertiliser.

2. Stage of Development of the Land.

Overcropping of virgin soil is often necessary as an aid to clearing. Much of the mallee land in South Australia was overcropped with this objective, and as pointed out by Presscott (20) applications of Sulphate of Ammonia should be highly beneficial under such conditions. In the pioneering stages of land development, from the financial position of the farmer, heavy crops are desirable, and on land which is cropped for some years in succession applications of nitrogenous fertiliser may be very necessary for good yields. The financial outlay on the fertiliser and the risk of complete loss of such outlay through agencies such as drought are involved, but in the more favoured parts of the Mallee, particularly, payable returns may be received from Sulphate of Ammonia under such a system of cropping.

In many of the newly-settled areas, such as those of the Lower Eyre's Peninsula, the possibilities of the fertiliser should be thoroughly investigated. The only danger is that the methods of farming employed might never advance beyond the pioneering stage if the farmer finds that he can produce payable crops with Sulphate of Ammonia, even when overcropping. Such a practice, if continued over a period of years, would be disastrous on the lighter soils, although the evils might not become quickly apparent on the heavier soils.

In this respect Sulphate of Ammonia must be used only as a means to an end. It has undoubted value on new land, but once the land has mellowed down and is fit to carry a permanent system of agriculture involving wider rotations and livestock, its usefulness will rapidly decline.

It is not only in the wheat belt that Sulphate of Ammonia may be valuable for a "clearing" crop. In the Southern Hills and South-East of South Australia and on Kangaroo Island, particularly on the sandy soils, it is a common practice to grow a crop of oats on the first burn prior to the seeding of Subterranean clover. Such crops being grown on poor virgin soil, often exhibit signs of nitrogen deficiency and the use of Sulphate of Ammonia should be beneficial to them, particularly as the rainfall is usually adequate.

In some cases, on Kangaroo Island particularly, settlers have found Sulphate of Ammonia to be of value on freshly-cleared land sown to Wimmera rye grass with the object of inducing a fine, dense cover for burning in the summer as an aid to clearing. The discrepancy between results obtained is extraordinary, in some cases the response to Sulphate of Ammonia has been nil, in others it has been most striking. Here again the character of the soil is undoubtedly the disturbing agent.

3. Farming Methods and Soil Fertility.

These two factors are interdependent to a certain extent in that soil fertility is largely under the control of farming methods. Too often, however, farming methods are conducted without any reference to soil fertility, and it is under these conditions that responses to Sulphate of Ammonia are most common.

The position has been clarified in recent years. Results have shown that if the farming methods are such that the land is not overcropped, plenty of livestock carried, adequate superphosphate applied and *per se,* a good cover of natural medics and clovers or of Subterranean clover obtained in pasture years, the soil fertility will be such that the application of Sulphate of Ammonia to stubble crops will be unnecessary. A high level of organic matter and of phosphates in the soil is the major secret of good farming. A high nitrate level follows as a natural corollary. Farming methods which produce these soil conditions are within the means of the majority of wheat farmers, and indeed, they must be practised if maximum returns over a period of years are to be obtained from the land.

The application of Sulphate of Ammonia on stubble crops grown on soils deficient in nitrogen might increase financial returns for that particular crop, but it makes no lasting contribution to soil fertility; it will not have any advantageous effect on the pasture in the following year or on the fallow crop three years later, as its residual and secondary effects are nil. It is a temporary adjustment only, and merely helps to postpone the evil day when the farmer will be forced to adopt wider and saner rotations, carry more livestock, and use more superphosphate. The transition period may be costly and even ruinous for other agencies such as erosion might take complete control. For this reason alone, which is of national significance, Sulphate of Ammonia should not be encouraged over the major part of the wheat belt, for there is conclusive evidence that under correct farming methods its use is not warranted.

4. Soil Reaction.

The regularity of results so far obtained on alkaline and acid soils indicates that it is not mere coincidence that the most striking responses to Sulphate of Ammonia occur on acid soils. The relationship between soil reaction and nitrate level is one which requires further elucidation, but sufficient is known of the relationship to indicate that significant differences are certain to exist between the nitrogen problems of alkaline and acid soils.

Richardson and Fricke (11) obtained a nitrate nitrogen level of 7.6 parts per million in the top 9in. of stubble soil at the Waite Institute prior to seeding, equivalent to approximately 20lbs. of nitrogen per acre. The soils of the Waite Institute are slightly acid. The investigations of the Melbourne University, conducted on soils of higher acidity than the soil at the Waite Institute, exhibited a range of 1.8 to 4.3 parts per million, or the equivalent of 4.7lbs. to 11.2lbs. of nitrogen per acre on stubble land, in the top 9in. of the soil. Prescott stated that nitrate values for unfallowed soils are invariably low (20). Taking the above figures the latter contention would at first sight appear to be correct, but the figures represent results from acid soils. Turning now to what figures are available for alkaline soils, and it is found that according to the report published by the University of Melbourne, the alkaline soil at Dumosa contained 20.6 parts per million or 53.6lbs. of nitrogen per acre in the top 9in. of soil prior to the planting of the stubble crop. Work carried out at Roseworthy College where the soils are also alkaline has shown that the top 18in. of soil, just after seeding, on a stubble field which had previously carried oats, contained 66.6lbs. of nitrogen, and on non-fallowed leyland the equivalent of 71.4lbs. of nitrogen per acre was obtained (21). On the basis that a 30bush. crop requires 50lbs.

to 60lbs. of nitrogen, and providing soil organisms do not utilise more soil nitrates than is usually assumed, there is sufficient nitrogen in [illegible] soil at Roseworthy to support a normal stubble crop.

The relatively high nitrogen levels in the two alkaline soils studied may have been due to accident, but the fact that applications of nitrogenous fertilisers have failed fairly consistently to increase yields on alkaline soils indicates that soil reaction may have an important bearing on the nitrate nitrogen level of stubble land. The fact that failure to respond from nitrogenous fertilisers on acid soils is rare adds considerable emphasis to this argument.

Fallowed soils at Roseworthy are very rich in nitrates, and estimations for the 1933, 1934, and 1935 seasons ranged between 100lbs. of nitrogen in the top 9in. of a medium fallow to 120lbs. of nitrogen in a good fallow. (24) Other limiting factors militate against and indeed prevent the full utilisation of this store of nitrogen, and a normal crop of 30bush. would use only 60lbs. of nitrogen. Soil organisms account for a certain quantity, but unless there is a loss of soil nitrates from the soil not yet discovered there should be a carry over of nitrates after the fallow crop has been taken off. Losses by dentrification and leaching, under the relatively dry conditions prevailing throughout the wheat belt, can be ignored. It would be a simple matter to ascertain whether there is any residual nitrate in the soil after a fallow crop, but to date this has not been done on alkaline soils. On acid soils, which are usually associated with higher rainfall, the crop is usually heavier and would thus be more exacting on the supplies of available nitrogen. In fact, under acid soil conditions, it seems probable that nitrogen may act in some years as a limiting factor to maximum yields, for it is probable that the original nitrate content as a result of fallow on acid soils is lower than that on alkaline soil. Taking into account both these factors, that is, the greater quantity of nitrate required by the crop and the comparatively lower quantities available, it is evident that the chances of a carry-over of nitrates would be considerably reduced on acid soils. This difference in carry-over, if it does exist, and there seems to be no valid reason to suppose that it does not, might account wholly, or at least to a very large extent, for the discrepancy of results obtained from Sulphate of Ammonia on acid soils on the one hand and alkaline soils on the other.

Soil nitrates are built up naturally by two main agencies:—

1. Non-symbiotic organisms which fix atmospheric nitrogen.
2. Nitrifying organisms which convert nitrogenous constituents of organic matter to nitrates.

Representatives of these two groups may be both bacteria or fungi, but the former are the more efficient.

The organism chiefly concerned with nitrogen fixation is the bacterium *Azotobacter* which is not tolerant of acid conditions. In acid soils the organism *Clostridium* is more common, but it is not capable of fixing as much nitrogen as *Azotobacter* for the same amount of energy used.

Among the most important conditions required for non-symbiotic nitrogen fixation are (1) a proper supply of energy material represented by organic matter, (2) a neutral or slightly alkaline medium, (3) available phosphorus, (4) correct temperature, (5) aeration of the soil.

On alkaline soils, therefore, it would follow that nitrogen fixation is very largely dependent upon the availability of sufficient organic matter in the soil and a high phosphate level, the latter can be supplied by superphosphate, and the former on a big scale only by a proper rotational system.

The major portion of the nitrate in the soil is formed by the oxidation of the ammonia formed from the decomposition of proteins and of other nitrogenous organic substances in the soil. This process of ammonification and nitrification is probably entirely biological in nature. The bacteria responsible for nitrification are less tolerant of acid conditions, and are most active in a slightly alkaline soil. Under acid soil conditions, the bacteria develop a tolerance and nitrification proceeds but is only very active when a high buffer or base content is present as a neutralising agent.

Because of the extreme importance of the process of nitrification the presence of sufficient organic matter in the soil is of fundamental significance. The higher the level of suitable organic matter in the soil the higher is the level of potential nitrogen, for besides providing the raw materials for nitrate formation and the energy supply for its liberation, the bacterial flora of the soil is more abundant. Just how far and by what means the presence of organic matter and its accompanying flora, and fauna for that matter, affect the fertility levels of the soil is not clearly understood. Agriculturally, however, it has been shown beyond all doubt that natural fertility is dependent upon the presence of organic matter in the soil; the microbiological relationships associated with its presence undoubtedly have more extensive and significant influences in rendering available, to higher plant life, the various constituents of the soil, that has been as yet elucidated.

As far as nitrate nitrogen formation is concerned a good deal is known, and in this connection organic residues rich in protein offer a greater potential source of nitrate than organic residues of more carbonaceous character. For this reason clovers and legumes, which, largely per medium of symbiotic nitrogen fixation, are richer in protein, when decomposed under the active agency of the so-called nitrifying bacteria result in a much greater accumulation of nitrates in the soil than if a like quantity of cereal straw, which is very low in protein, were decomposed under the same conditions. In the latter case, the nitrifying bacteria, in the absence of sufficient protein in the organic matter, obtain their nitrogen requirements from the nitrates already present in the soil, and in this way it is quite conceivable that the decomposition of such material so low in protein may have a depressing effect upon the immediate supplies of nitrate nitrogen. The leyland cover of any soil, however, is reasonably high in protein. It is increasingly evident that the growth of medics and clovers is much more abundant on well farmed alkaline regions of the wheat belt, than it is on similarly treated areas where the soil reaction is acid. It must be conceded that the organic residues incorporated in the soil in the latter are inferior, as potential sources of soil nitrate to the highly proteinous residues which are most frequently found under alkaline conditions.

Granting this difference in actual raw materials supplied, there is also the factor of slower nitrification in an acid soil than in an alkaline soil and this factor is probably responsible for certain results which, at first, seem incongruous, such as the occasional response to Sulphate of Ammonia of stubble crops grown on soil of acid reaction previously known to carry a good cover of Subterranean clover.

On acid soils, nitrogen fixation is probably much slower and this may be another factor leading to the discrepancy between the nitrate nitrogen content of alkaline and acid stubble soils prior to planting.

Throughout the wheat belt, however, moisture is a limiting factor to nitrogen fixation, and, apart from short periods after summer showers, the bacteria could be active only in the spring months, before the harvest of the fallow crop, and in the autumn of the following year. The nitrogen fixed in this period could not possibly amount to more than a few pounds per acre. It is doubtful, therefore, whether nitrogen fixation in itself is sufficient to account for the wide differences which exist between the nitrate nitrogen levels of acid and alkaline stubble areas. This lends support to the possibility of carry-over nitrogen, built up by symbiotic nitrogen fixation in the pasture years and by nitrification and non-symbiotic nitrogen fixation during the fallow period immediately preceding the crop, which, for other reasons, is unable to make full use of the available nitrogen.

There is probably a number of factors which contribute to the discrepancy in nitrate content between acid and alkaline soils, but the above are considered, theoretically, to be the most important. Differences in the rate of nitrification and nitrogen fixation as determined by the soil reaction and type of organic matter certainly require investigation if the uses of Sulphate of Ammonia under Australian conditions are to be accurately determined.

Sulphate of Ammonia for Specific Use.

It is apparent from the foregoing that Sulphate of Ammonia, as a fertiliser, cannot, by any means, be unreservedly recommended. The conditions controlling response are many and variable, and proper understanding of causes and effects associated with these is necessary before sound advice on the use of the fertiliser can be given.

Only under specific conditions can the fertiliser be used and advocated with advantage. Except in the case of high rainfall, and other favourable climatic circumstances during the growing period of the crop, most of these conditions are discernible, and any good agriculturist may thus be able to use, or advocate the use of Sulphate of Ammonia with discrimination. Whereas, under average or normal conditions response may be negative, under specific conditions it may be quite profitable. For instance, under average conditions of the South Australian wheat belt summer growth in the stubbles is negligible, but in some years, when late spring and summer rains are experienced, splendid stubble feed results. Obviously, the growth of additional plant life, following the fallow crop, must reduce the nitrate levels for any stubble crop that may follow in spite of the fact that nitrification would be proceeding more rapidly under the more favourable soil conditions. As witness to this, in 1936, on the College farm at Roseworthy, an oat crop sown on a pea stubble suffered sadly from nitrogen deficiency. The pea stubble, thanks to opportune summer rains, carried an enormous bulk of greenfeed throughout the summer months (22). This greenfeed more than counteracted the benefits bestowed on the nitrogen level of the soil by the pea crop. From practical experience it would appear that the drain of summer greenfeed on the nitrate level of the soil is very high in relation to the bulk of green matter produced. Heavy summer rains, especially when associated with good growing conditions, may, therefore, have a serious effect on the nitrate levels of stubble fields and, following such periods, if stubble cropping is to be resorted to, response from nitrogenous fertilisers is more likely. This has a fairly wide application, but is probably more significant in the high rainfall areas than it is under conditions similar to those at Roseworthy. This example of nitrate deficiency, which may occur in the wheat belt even on farms where modern rotations are practised, is especially mentioned to illustrate the possibilities of Sulphate of Ammonia *following certain seasonal conditions.* A ready recognition of nitrate deficiency, when it does occur, is necessary to the man on the land, and, through practical experience, he might be able to anticipate unusual years when the application of Sulphate of Ammonia to stubble crops should be an economic proposition. Such an anticipation should not be beyond the capabilities of the progressive farmer and the application of the fertiliser in such years would in no way be detrimental to a sound farming policy.

Apart from other specific uses already mentioned, such as on freshly cleared land, the use of Sulphate of Ammonia on crops sown on sand drifts in the better rainfall areas of the wheat belt could be more fully investigated. Such drifts are very low in organic matter and dressings of Sulphate of Ammonia generally cause a marked increase in vigour. Not only are the chances of a payable crop increased, but, in the event of dry weather and wind, the added vigour of the young plants offers a better and quicker cover, decreasing the chance of failure due to destruction of the plants. After harvest, the increased organic matter and thicker stubble from the crop which received Sulphate of Ammonia should be of added value in holding the soil over the summer.

By way of conclusion, whatever may be the specific uses of Sulphate of Ammonia for stubble crops, it has no universal appeal, and, in fact, if the consequences of overcropping are to be avoided, the present system of stubble cropping must be seriously modified, and under any sane scheme of modification nitrogen supplies can best be produced on the farm by judicious crop and animal husbandry.

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The Breeding of Comeback and Corriedale Sheep.

The Chief Agricultural Adviser (Mr. R. C. Scott), has advised the Secretary of the Coonalpyn Branch of the Agricultural Bureau, who asked, "What is the breeding of Comeback and Corriedale Sheep," that any cross-bred sheep in which the blood of any pure breed predominates may be described as a Comeback, that is to say, coming back to that particular breed. However, in Australia where the Merino sheep is the most important, a Comeback is commonly understood to be a cross-bred sheep possessing a higher proportion of Merino blood than any other. Consequently, if any half-bred Merino ewe is mated with a Merino ram, the progeny would be known as Comebacks. There is therefore no regular line of breeding for the development of the Comeback sheep; in fact, the term Comeback is more or less an Australian one, and there is no distinct breed named Comebacks.

The Corriedale is an inbred half-bred Merino-Longwool sheep evolved in New Zealand about 50 years ago. In their origin there were two distinct strains, namely Lincoln-Merinos and English Leicester-Merinos, and even to-day the animals in some studs lean either towards the Lincoln or English Leicester according to the foundation blood of that particular stud.

It is possible also that there may have been an infusion of some other longwool blood in their development, and therefore the Corriedale is usually described as an inbred half-bred longwool Merino sheep, but the three breeds most concerned in her origin are Merino, the Lincoln and the English Leicester.

Turretfield Seed Wheat Farm Harvest Report 1936-37.

[By L. J. Cook (Experimentalist) and F. E. Waddy (Farm Manager).]

The work of producing selected and improved strains of seed wheat at the Turretfield Farm has now completed its fifth season. It was necessary to commence operations with a limited number of individual ears selected from plants possessing the desired characteristics. Stud, selection, and bulk plots have been gradually built from these, and the work has now reached the stage when practically all wheat grown on the Farm has been developed from selected plants, and conseqently all wheat offered to farmers is derived from these plants of true characteristics.

Selection is continued each season from the hand plots, so that as these pass through the stud and bulk plots from year to year, the quality and prolificacy of each variety will be maintained and improved, by the elimination of the poorer types, and the saving of seed only from those plants true to their variety and of good healthy development.

The Stud Wheat Plots.

Amongst the 1,604 acres comprising Turretfield, approximately 1,250 acres are available for seed wheat production, and this area has been cropped mostly on a three-course rotation of bare fallow, wheat, pastures, the latter being peas or oats for grazing or natural pasture. Under this system, it has been found difficult to maintain the fertility of the soil, especially on certain fields where soils set hard quickly and lack physical condition. To overcome this, it has been decided to lengthen the rotation to a four course of bare fallow, wheat, and 2 years pasture. Peas and oats will be sown on the wheat stubbles, and it is hoped to secure the hay requirements of the Farm from amongst the oat crops so that we can continue to harvest approximately 300 acres of wheat for grain. It is apparent that the second year pasture will produce more natural leguminous plants, and under careful grazing management, lead to the maintenance of soil fertility, with high yielding wheat crops to follow.

1936 Season.

Particulars of the rainfall recorded at Turretfield for the last 5 years comparatively with the average for the 29 years 1908-36 period are shown in the following table:—

RAINFALL AT TURRETFIELD.

	1932.	1933.	1934.	1935.	1936.	Means, 1908-36.
	In.	In.	In.	In.	In.	In.
January	0·45	1·44	0·36	0·76	1·89	0·61
February	0·99	0·13	—	—	0·75	0·68
March	0·92	0·57	0·36	1·87	0 07	0·76
April	2·60	0·92	1·94	1·45	1·35	0·90
May	1·14	3·04	0·12	1·44	1·53	2·26
June	4·00	0·59	0·97	2·64	1·34	2·13
July	2·27	1·55	1·94	1·74	2·01	2·05
August	2·44	2·67	2·37	2·48	1·45	2·12
September	1·71	3·29	2·93	2·87	0·44	2·30
October	2·29	0·72	2·04	2·35	1·94	1·72
November	0·34	0·36	2·16	0·80	0·28	0·97
December	0·89	1·05	0·30	0·42	1·62	0·95
Total	20·04	16·33	15·49	18·82	14·67	17·45

"USEFUL" RAINFALL.

	1932.	1933.	1934.	1935.	1936.	Means, 1908-36.
	In.	In.	In.	In.	In.	In.
Seeding rains (April-May) ...	3·74	3·96	2·06	2·89	2·88	3·16
Winter rains (June-July) ...	6·27	2·14	2·91	4·38	3·35	4·18
Spring rains (August-October)	6·44	6·68	7·34	7·70	3·83	6·14
Early Summer rains (November)	0·34	0·36	2·16	0·80	0·28	0·97
Total	16·79	13·14	14·47	15·77	10·34	14·45

The total fainfall for 1936, namely 14.67 inches, was considerably below the average fall for the last 29 years, whilst the amount of "useful" rain was even further below average, less than 10½ inches being received for the period, against an average of 14½ inches.

Heavy flooding rains in the second week of January scoured the fallows very badly on the slopes, and in places along the gullies removed all the surface soil, leaving solid clay or reefs of rock exposed where previously there was a coating of well worked soil.

A good rain in early April allowed the fallows to be worked into some order, but the dry weather holding from then until the last day of May, gave a poor germination to early sown wheat.

Conditions were bad during August, September and early October, being extremely unfavourable until a good rain of 67 points on 18th October saved the situation and allowed the grain to ripen. Hot winds were experienced as early as 19th August. Several hot, windy days with dust storms, interspersed with severe frosts were experienced in September. Unseasonable rains in December delayed harvesting, but did not cause any material loss of grain in quantity or quality.

Wheat Harvest.

The wheat crops were sown on well prepared fallow land with 75lbs. seed and 156lbs. 45 per cent. superphosphate per acre.

WHEAT YIELDS—TURRETFIELD, 1936-37.

Field.	Variety.	Acreage.	Total Yield.		Acre Yield.	
			Bush.	Lbs.	Bush.	Lbs.
14	Ranee 4H	59·09	1,821	1	30	49
11	Sword	65·98	1,467	12	22	14
11	Ford	33·32	715	27	21	28
15	Nabawa	49·43	938	0	18	59
16	Dundee	35·11	657	33	18	44
16	Merridin	8·31	132	20	15	55
16	Sultan	18·14	258	41	14	16
11 Selection Plots	Sword D	2·42	52	0	21	29
11	Sword B	2·15	46	0	21	24
11	Ford	2·33	46	0	19	45
11	Federation	1·36	24	35	18	5
11	Dundee	1·84	32	30	17	40
11	Sultan	1·64	27	0	16	28
11	Nabawa	1·38	22	37	16	23
11	Ranee 4H	1·90	25	0	13	9
		284·4	6,265	56	22	2

AVERAGE WHEAT YIELDS, TURRETFIELD, 1933-36.

Year.	Area, Acres.	Total Yield.		Acre Yield.	
		Bush.	Lbs.	Bush.	Lbs.
1933	348·04	7,169	37	20	36
1934	306·19	6,906	36	22	33
1935	323·89	7,413	55	22	53
1936	284·40	6,265	56	22	2
Mean Yield, 1933-36	1,262·52	27,756	4	21	59

The foregoing table shows that 6,265 bushels 56lbs. grain were secured this season from 284.4 acres, and the average yield of 22 bushels 2lbs. per acre was very satisfactory, and must mainly be attributed to the good fallowing methods carried out on this Farm, which enabled crops to withstand adverse weather conditions until the late October falls arrived to cause a good finish.

It is significant that the yield from Field No. 14, which has been out of cultivation, and under pasture for the past ten seasons, was very much greater than yields from other fields. The yields of varieties vary considerably and cannot be used as a comparison of values, because different classes of soil made all the difference in the yields. In fact, wheat plants failed to mature on some of the limestone outcrops, and on areas surrounding trees.

All grain was suitable for sale as seed, after grading, and orders to the amount of 5,500 bushels were filled. The demand for the seed was keen, and orders for another 4,000 bushels had to be refused, hence farmers desiring seed should forward orders early to save being disappointed.

The variety Merridin was included amongst the test this year in place of Waratah, on account of its better milling qualities. Also work has been discontinued with Federation on account of the lack of demand for its seed. Selection is being commenced with the Gluyas variety with the object of placing back on the market the old type of this variety, that was the leading State variety for so many years.

Apart from the high yield of 30 bushels 49lbs. per acre secured from Ranee 4H in field No. 14, the varieties of Sword and Ford yielded well with 22 and 21 bushels per acre in both the bulk and selection plots.

Hay Harvest, Turretfield, 1936-37.

On account of the poor finishing growth of oats, the hay was this season cut from the wheat fields and headlands, which reduced the area for grain harvest.

HAY YIELDS—TURRETFIELD, 1936-37.

Field.	Variety.	Acreage.	Total Yield.			Yield per Acre.		
			T.	C.	L.	T.	C.	L.
11	Sword and Ford	15·3	25	10	0	1	13	37
15	Nabawa	19·4	27	10	0	1	8	39
14	Ranee 4H	7·47	9	0	0	1	4	11
16	Various Wheats	39·5	38	10	0	0	19	55
		81·67	100	10	0	1	4	68

AVERAGE WHEATEN HAY YIELDS—TURRETFIELD, 1934-36.

Year.	Area, Acres.	Total Yield.			Yield per Acre.		
		T.	C.	L.	T.	C.	L.
1934	56 76	129	10	0	2	5	59
1935	81 24	177	0	0	2	3	64
1936	81·67	100	10	0	1	4	68
Mean, 1934-36......................	219·67	407	0	0	1	17	6

In all 100½ tons wheaten hay were cut from 81.67 acres, yielding an average of 1 ton 4cwt. 68lbs. per acre, which was 1 ton per acre less than for the previous two seasons.

Sword and Ford wheats again proved their value as hay wheats in returning 9cwts. per acre more than the average for the season.

Rugged Ewes feeding at Turretfield Farm.

Fodder Crops.

Oats.—It is customary to sow a field of oats on stubble land, which is used for grazing by the sheep. Towards the end of Winter, portion is usually closed from stock, and allowed to make growth for hay to save the wheat crops for grain. As this season was so dry, the oats failed to make headway during September, and none of this class of hay was secured.

Fields Nos. 12 and 3, about 180 acres, were sown with Algerian and New Zealand Cape Oats. The wheat stubble of 1935 was burnt, and the fields cultivated before seeding. These oats were of great value as grazing crops, providing good feed over an extended time. The portion closed from stock, late in September, yielded 585 bushels of oats from patches that were harvested.

Peas.—40 acres of Field No. 3 were sown to White Brunswick peas, and grew well, until a heavy frost following a hot wind at flowering-time caused a very poor setting of pods. A very useful return from grazing was obtained.

Wimmera Rye Grass.—A method of seeding the rougher portions of the farm with Wimmera Rye Grass for grazing as a pasture has been adopted, and small areas are being sown each season.

Field No. 26 was established in 1935 and Field No. 49 (20 acres) was sown this season. Peas are used as a cover crop for the grass, the land being ploughed, drilled, and harrowed, using 100lbs. White Brunswick peas and 4lbs. Wimmera Rye grass seed with 1cwt. 45 per cent. superphosphate per acre. The Rye grass seeds amongst the peas, and when grazed by sheep late in the year, much of the grass seed falls, and is trodden into the soil, and benefiting from the increased nitrogen supplied to the soil by the peas, a very good pasture is obtained. With annual applications of superphosphate this pasture will greatly increase the grazing value of these rougher lands that are not suitable for wheat growing.

Pasture Seed Certification in South Australia.

A pasture seed certification scheme was commenced in South Australia last year under which seed harvested from registered areas was inspected by officers of the Department of Agriculture, and if of the desired standard, a certificate to that effect was issued.

This certification permitted purchasers to operate with confidence, and letters of appreciation were received from buyers of subterranean clover seed in New Zealand.

The varieties inspected and certified were subterranean clover, Wimmera rye grass, Perennial rye grass, *Phalaris tuberosa*, Evening Primrose, Strawberry clover and Lucerne.

It is necessary that the crop should be inspected in the field to ascertain the purity, strain, and freedom from noxious weeds.

Therefore, those who intend harvesting pasture seed and desire to be included in the certification scheme this season, should make early application for their fields to be inspected and registered. There is no charge for certification, nor is there any set form of application for registration. All that is required is for producers to write to the Director of Agriculture requesting registration, and advising where the area to be harvested is situated.

The other States of the Commonwealth have seed certification plans in operation, and as purchasers consistently demand certified seed, it is to the advantage of producers to be included in the scheme conducted in South Australia.

Wireless Talks

Some Aspects of Potato Growing in South Australia

By H. H. Orchard, District Horticultural Adviser. Talk broadcast through Station 5CK.

The potato is a native of the North-West of South America, and was cultivated for food by the natives, probably hundreds of years before its existence was first recorded in literature, in 1553.

It was introduced into Europe in the latter part of the sixteenth century, probably 1580, but nearly 200 years elapsed before it was cultivated to any extent as a field crop in the British Isles.

It was first recorded in Australia in 1788, when Governor Phillip of New South Wales planted 9 acres, and by 1804 the area under potatoes had increased to 263 acres.

Tasmania early established a reputation for heavy yields, superior quality of the produce, and good seed. New South Wales obtained most of the early stocks of seed from this source, and it is recorded that one of the earliest importations served a double purpose. When being prepared for the table, they were thickly peeled, the peelings were planted and a fine crop raised.

In 1838, Victoria had its first crop of 20 acres and two years later the area had increased to 150 acres.

In South Australia, the first pioneers from England in 1836, upon landing on Kangaroo Island, were shown fine potatoes grown by the sealers living on the island. George Stevenson, himself an expert gardener, mentioned this fact in a address in in 1839 and went on to say that "The potatoes were scarcely more acceptable to the palate after a long sea voyage than as proof of the fertile land we had reached."

A Potato Crop in the Mount Gambier district.

Just 100 years later, the area under potatoes in South ustralia was 4,657 acres, and the production 20,923 tons, which gives an average yield per acre of 4½ tons. During the last four years, production has steadily increased by 1,400 tons, the yield per acre has improved to the extent of one ton, but the area under potatoes has fallen nearly 1,200 acres. This reduction in acreage is hard to understand when it is realised that during the same period the average annual imports from neighbouring States totalled 6,122 tons. At a conservative estimate of £5 per ton, this represents £30,610 annually paid away on the importation of an article which can be successfully grown in many parts of South Australia. There must be something wrong, and it is reasonable to presume there is room for improvement in potato growing in this State.

The potato, next to the cereals, is probably the most important food plant grown for man, and whilst it is very adaptable and can be grown within a wide range of climates and conditions, it has certain peculiarities. For instance, its cropping and price fluctuate more than those of any other common crop, diseases are apt to take a greater toll, and there is probably more capital involved per acre than with other farm crops. In 1936, the average value per acre in South Australia was £35 6s. 3d.

These factors may have some bearing on the position, but there are others of great importance and none more so than seed selection—seed, of course, meaning the tubers used for planting and not the seed of the fruit produced from the flower. Attention is constantly being directed to the importance of certified seed wheat, pedigreed stock, and so on, but sufficient prominence is not given to the necessity for certified seed potatoes carrying a guarantee of purity and soundness. A few years ago an effort was made by a few South Australian growers to establish a seed certification scheme involving the production and distribution of seed potatoes from crops reasonably free from virus diseases. Unfortunately for the industry, the movement lapsed for want of support.

The generally adopted practice of selecting seed from the small tubers left, after the marketable ones are bagged, leaves considerable room for improvement. Plants of low vitality, especially those affected with virus diseases, tend to produce numerous small tubers, which, under the present system, are used for planting the following season. With successive plantings, the percentage of affected potatoes rapidly increases, and the returns progressively decrease, until finally, the strain becomes unprofitable and what is popularly known as "run out."

Virus diseases are distinguished by the crinkling, curling, rolling, and mottling of the leaves, and a dwarfing of the plant, and are usually spread by sap-sucking insects carrying diseased sap to healthy plants: the tubers, as a rule, do not show any sign of disease.

The necessity is apparent, therefore, for something in the nature of a stud plot, large enough to supply seed requirements for the following planting. Rogueing, that is the removal of foreign and diseased plants during active growth, should be practised throughout the plot, and this would leave only a pure strain of strong healthy plants, the produce from which could, with confidence, be used for planting. This plot should be a regular feature every year amongst potato growers. The removal of foreign plants would only be necessary for the first year, and as they can often only be distinguished by a different coloured flower, an examination at flowering time is essential.

Failing a stud plot, the growing crop should be regularly examined and the healthiest and strongest plants marked in some way so that when dug, the produce could be reserved for seed purposes.

Over a number of years selected seed has given an average increase of 2 tons per acre above unselected seed—a good return for the little extra labour involved.

If selection along the lines outlined became more general, the importation of seed potatoes at least would receive a check. Seed would not degenerate or "run out," the customary procedure of purchasing fresh seed every few years would not be necessary, and, a matter of importance, the grower would not be so greatly influenced by the fluctuations of the market. Obviously, there are times when a change of seed is advisable, but once a grower has obtained a strain which does well in his district and suits market requirements, generally a white, smooth-skinned, well shaped potato, he should do all in his power to hold it.

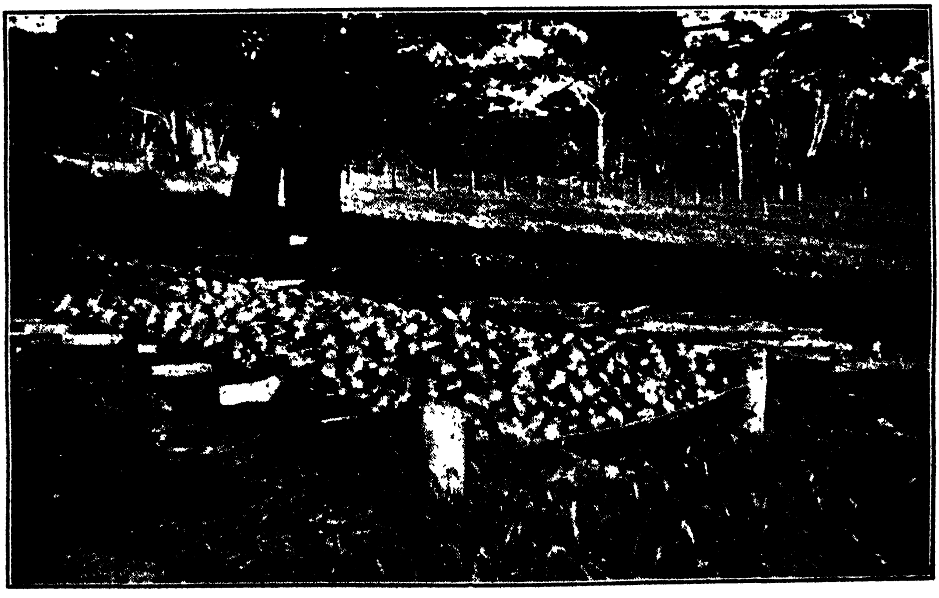
There are some growers who practise seed selection as instanced by the Mount Compass School Boys' Competition. Last year from 1lb. of seed comprising 10 tubers cut into 100 sets, 603½lbs. of potatoes were dug. The seed used was produced in the Ashbourne district. Such small sets are not advocated, nor would they be practicable for a field crop. The figures are quoted to illustrate what is possible under intensive cultivation, from carefully selected seed.

For the field crop, seed of not less than 1½ozs. is recommended where the soil is in good heart, and whole seed or larger—cut—should the soil be somewhat dry at planting.

STORAGE AND DIPPING.

In conjunction with selection can be considered the question of storage; the keeping of the seed from the time of digging until the following planting. Ventilation and light are essential; ventilation to assist the development of strong sprouts and light to assist the greening of the potato. These essentials can be obtained economically by storing the tubers, not more than three deep, on racks placed a few inches off the ground, under the shade of pine trees. toring in bags is detrimental to the vitality of the potato. The long, white, sappy shoots made in the absence of light are all removed prior to planting, and, in consequence, the potato is weakened and less likely to shoot again. Rack stored potatoes on the contrary, in addition to greening, develop short, sturdy sprouts which are not readily damaged at planting time. A potato with slender, weak sprouts should be discarded, as "Spindle Sprout," by which name the trouble is known, is no doubt responsible for many of the gaps seen in crops, because too frequently such potatoes are planted. Proper sprouting prior to planting and the elimination of "Spindle Sprout" would materially assist in raising the yield per acre.

Another operation worthy of greater attention is that of dipping the seed in a formalin solution prior to planting. Corrosive sublimate and other organic mercurial compounds may also be used. Dipping controls Collar Stem Rot and Common Scab, two diseases which are responsible for losses. The formalin solution is used at a strength of ¾ pint of formalin to 20galls. of water for unsprouted



Seed Potatoes on racks. Tubers stored in this way give better results than those kept in bags.

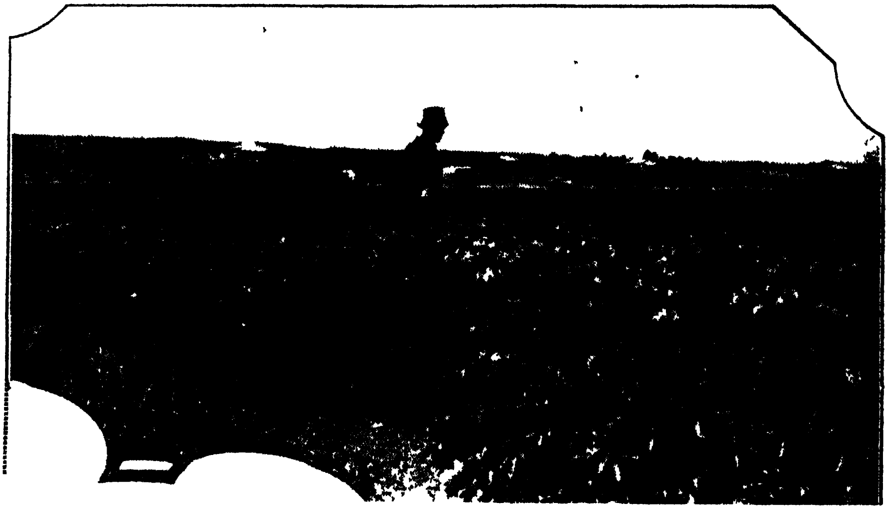
seed and ¾ pint to 30galls. for sprouted seed, and immersion lasts 1½ hours. The cost of dipping is 2s. 6d. per ton, and the increase in yield over undipped seed has averaged 3 tons in experiments conducted over a number of years.

FERTILISERS.

Fertilisers play a big part in crop production, provided the seed is right, and heavy dressings have proved their value. In light sandy soils, 6 and 1 super and ammonia has given excellent results in this State, and 3 and 1 in heavier soils. The question of fertilisers is a very debatable one amongst growers, but the potato is a gross feeder, so the artificial fertiliser should be placed, with the seed, in the furrow where it is readily available to the first young roots thrown out, thus enabling the plant to make a good start.

Moulding should be a regular operation and carried out about flowering time, while the rows are still well defined. The growing tubers are then protected from the sun, and the risk of the grub of the Potato Moth damaging the tuber greatly lessened. This protection is necessary at all times, but in a dry season, such as was experienced last year, the necessity becomes very apparent. The dry conditions encourage cracking of the soil, thus providing ready means for the potato moths to reach the developing tubers and lay their eggs, and commence an infestation which might be responsible for serious losses before the potatoes are marketed.

Unfortunately, the good work of keeping the developing tubers free is frequently offset by growers exposing the matured tubers to the risk of infestation. Potatoes should be bagged without delay after digging, and the bags sewn up immediately. The practice of covering the mouth of the bag with potato tops as a protection from the sun is very faulty. These potato tops, or haulms, probably carry moths and grubs, even though the potatoes themselves are free, and they will move on to the bagged potatoes, to lay their eggs or enter the potatoes and commence the damage which the grower has prevented during the growing period.



Potatoes on reclaimed swamp land at Jervois.

While the operations mentioned largely control yield, continuity of supply is a matter which has a bearing on imports. From now on until the end of the year, the greater proportion of the crops are planted, the early planted crops comprising a small proportion. This frequently results in a market over supplied, when prices slump, and at other times in a market short of requirements and supplies must be imported. At the present time there does not appear to be sufficient early crops grown. On well drained land above the frost line, or land which can be reasonably expected to be safe from frosts from the time the young plants break through, potatoes can be planted from May onwards. The potato will grow in most soils, short of a heavy clay, in districts favoured with a good average rainfall, or where irrigation is practised, but only by thorough methods can its culture be made a profitable one.

The operations discussed have probably the greatest bearing on potato growing, and if growers generally would give more attention to them, an important industry would receive a much needed fillip.

From Blossom to the Consumer—Production of Quality Fruits.

By A. G. Strickland, M.Agr.Sc., Chief Horticulturist. Talk broadcast through Station 5CK.

Most of us are acquainted with that rather approximate classification of living things into those which are plants and those which are animals. Moreover, we know that, as a general rule, animals are equipped with organs—legs, wings, and so on—which enable them to move from one part of the earth's surface to another.

Plants, on the other hand, are usually fixtures. Although plants have not been endowed with locomotive powers, Nature has provided means whereby their seed may be spread from place to place. Some seeds are so formed that they may be carried long distances by wind; others are adapted to carriage by water. The seeds of most of the fruits which we commonly use as foodstuffs are designed, however, for dispersal by animals, and have been given special attributes to ensure that animals will cooperate in this design. The fruit which contains the seed is made attractive; it is given colour, aroma, flavour, and food value in order that the animal may be tempted.

The fruitgrower is not directly concerned with these considerations, but in a sense there is a similarity between his problems and those of Dame Nature. He must produce fruit which will tempt the most discerning of animals—the human—and tempt sufficiently to make him buy.

So much fruit is now being grown throughout the world that production of fruit which is attractive in appearance and attractive to the palate is rapidly becoming a necessity. People are being told that fruit is good for them, but this is not enough to make them buy; the fruit offered must look tempting.

The term "quality" in its application to fruit may be conveniently considered under two headings—external quality, having relation to size, colour, freedom from surface blemishes, and so on; and internal quality, having relation to flavour and texture.

External quality is largely, but not solely determined whilst the fruit is on the tree; flavour and texture of the flesh are governed not only by conditions during growth on the tree, but also by such factors as time and manner of harvesting and the treatment to which the fruit is subjected between the time of picking and its arrival in the hands of the consumer.

Let us first consider those factors which have bearing on the external quality of the fruit, and which operate mainly during its growing period on the tree.

The size of fruit is to some extent controllable, winter pruning of various types of fruit trees being largely directed at reduction of fruit-bearing wood, so that the tree will not be required to mature more fruits than it can comfortably swell to optimum size. Estimation at pruning time of the tree's capacity in this respect can only be approximate, and it is often desirable to utilise the additional practice of fruit thinning to further reduce, after setting, the number of fruits on the tree.

Many varieties of plums, peaches, apples, etc., cannot be adequately dealt with at winter pruning, and routine removal of a number of fruits in order to enable the remainder to grow sufficiently large should be more generally practised.

It is, of course, possible to have fruit too large, and this contingency is not so capable of direct correction. Large fruit is unfortunately an unavoidable feature of the light crops experienced in the case of meteorological accidents, such as frosts, and more regularly in those fruits disposed to crop alternately.

Colour of fruit is of marked importance in increasing its attractiveness, and, therefore, its value. Little, however, can be done in the way of orchard treatment to influence colour. In the case of apples, peaches, and nectarines, which for the development of high colour require strong light, thinning of fruit, and pruning to open out the tree, will tend to improve colour by virtue of increasing the amount of light reaching the fruit. Cultural and fertilizer practices seem to influence red colour only in so far as they influence maturity and the amount of shade on fruit-bearing surfaces of the tree.

Brightness of colour is perhaps more important than density, and under conditions of water shortage or excessively intense sunlight confusing colour pigments may tend to mask the brightness of normal red colour in such fruits as the apple and peach.

The orchardist is often at the mercy of the elements in regard to colour development in certain fruits, and can take little direct action to improve colour. Pruning and thinning do have an influence though, and experience has shown that certain districts are unsuitable for the growth of fruit varieties which require high colour.

In passing, it is interesting to note that artificial aids to beauty have sometimes been employed for fruit. With peaches, the amount of red colour may be increased by spraying the young fruit with lead arsenate, the effect apparently being produced as a result of injury to the skin. This method is, however, not recommended, as it is difficult to control the amount of injury occurring, and excessive injury may lead to pitting of the fruit and an unsightly purple colour instead of red.

More direct methods than these were employed by the opportunist who, having a quantity of pale and wan-looking peaches on hand, secured a paint spray outfit and some red lacquer. For obvious reasons, it would be unwise to follow this lead.

Blemishes of various kinds occurring on the skin of fruit have considerable effect in lowering quality. There are three main classes of superficial skin blemish, namely, those due to diseases or insect pests, those due to climatic agencies, and those due to spray injury.

The ravages of various insect pests and diseases are familiar to growers—trees may be killed or debilitated, fruit may be ruined. Most often, however, damage is only partial, and instead of ruining the fruit many pests merely blemish it to varying degrees.

When such blemishes occur the fruit either becomes unsaleable, or, where blemishes are comparatively minor, saleable only as low grade produce.

Present day market requirements are such that control measures for pests and diseases must be aimed not only at saving the tree or its fruit from destruction, but at reducing surface blemishes to an absolute minimum. Only thus is it possible to obtain a line of fruit which can be culled to market standards with the minimum expenditure of time and labour.

Surface blemishes, due to climatic agencies, are not so readily controllable as those due to pests; in fact, some of the climatic agencies are entirely beyond human control. An untimely hail storm may seriously blemish a crop of fruit in a few minutes, and the grower is powerless to prevent or alleviate such damage.

On the other hand wind, although it cannot and does not effect in any particular instance such wholesale destruction as hail, probably leads to larger and more regular losses of fruit throughout the State as a whole. If it were possible to assess the direct financial losses of growers of apples, pears, citrus, and other fruits as a result of wind injury and total such losses I am sure the State total would be a staggering one.

Wind injury to fruit is in a large measure controllable; judicious pruning of deciduous fruits and removal of dead wood from citrus trees will assist indirectly. In many instances the direct agent—*i.e.*, the wind itself—may be deflected by provision of shelter belts. The necessity for wind breaks is perhaps more evident in our citrus areas, but I am sure that many orchards in other parts of the State would also benefit if protected from prevailing winds.

Other climatic factors are probably of importance in connection with blemishing of the russet type. Here, however, we have an inter-relation with various types of spray injury, and often weather conditions may receive more blame than is due to them.

Experience has shown that certain types of spray are dangerous at certain stages of fruit development. Bordeaux mixture applied later than green tip to many varieties of apple will almost certainly result in russeting. Certain spray materials cannot be mixed together with safety, and always it is necessary to take existing and probable weather conditions into account when applying many of our orchard sprays. Hot weather immediately following application of sulphur compounds will almost invariably lead to injury.

Whilst there is yet much to learn regarding spray injury many commonly occurring types of spray blemish are entirely avoidable if due notice is taken of existing knowledge.

That which I have termed external quality of fruit is of great importance, and demands constant attention throughout the growing season.

During the period of protection of the fruit from external blemishes complex processes are taking place within each fruit, processes which, in the case of healthy trees, may be expected to reach a normal conclusion without occasion for the orchardist to interfere. As the fruit approaches maturity, however, it is time for the grower to consider the question of internal quality.

The stage at which the fruit is picked from the tree has very important bearing on internal quality, on the flavour, aroma and texture that such fruit will possess when it reaches the consumer.

There is little difficulty concerning fruit intended for immediate consumption; it may be permitted to attain full ripeness on the tree.

Fruit which is intended for cool storage or for a far distant market cannot, however, be allowed to ripen on the tree; it must be picked before attaining full maturity.

Everyone recognizes the fact that a fruit tree is a living thing, and that each swelling fruit upon a tree is also living. Few people, however, stop to consider what happens to fruit when it is picked from the tree. Does it die in an instant? No. The fact is that after harvesting fruits continue to live; they breathe in oxygen, exhale carbon dioxide, and gradually use up the food material which has been stored within them.

Each kind of fruit has its own normal expectation of life after picking—berry fruits a few weeks, peaches and apricots a little longer, and apples still longer. Furthermore, within limits the lower the temperature at which they are stored the more slowly do fruits live; by cooling, we can prolong their life.

Certain of the shorter-lived fruits we do not attempt to transport over long distances or keep for long periods—at least, not in their fresh state. Others which have longer expectation of life must be handled with respect lest their life be brought to an untimely end before they reach the consumer.

Fruit intended for long keeping or for export must be harvested when sufficiently advanced to enable normal completion of ripening during or subsequent to storage, but also before it has reached full maturity.

Correct picking maturity is of utmost importance in determining the final internal quality of stored or exported fruit. For instance, apples picked before they are sufficiently mature will shrivel, develop bitter pit in the case of susceptible varieties, and can never mellow to an attractive product.

On the other hand, if picked too mature, or mishandled after picking, they are quite likely to die before reaching the consumer; they will develop rots, internal browning, or breakdown, or at best will become mealy and unpalatable.

Determination of the correct stage at which to pick various fruits for various purposes is becoming simpler as the result of cool storage experiments accumulate, and within reason the grower can, by exercising his discretion, readily meet this contingency.

Having picked the fruit at the right time, however, it must be remembered that the fruit will live quickly, and die early, if exposed to high temperatures for any appreciable period.

Production of high quality fruit—fruit which is attractive, both internally and externally—is a constant task, commencing before the trees burst in spring and extending right up to the delivery of the fruit into the consumer's hands.

It is, however, a task which is worth doing well, for although some markets may be over-supplied in a general sense, there is probably no market which is over-supplied with highest-quality fruit.

Tubercle Free Herd Scheme.

The following herds have been tested and comply with the conditions laid down by the Tubercle-Free Scheme, whereby stud-owners may apply to have their herds tested, free of charge, by the Stock and Brands Department:—

Owner and Address.	No. of Cattle.	Expiry Date.
1. J. H. Dawkins, Para Wirra Jersey Stud	25	16/4/38
2. W. Hawker, Anama Friesian Stud, Central Bungaree, *via* Brinkworth	40	26/6/38
3. O. H. Woodward, Marama Jersey Stud, Gilles Plains	22	2/11/38
4. G. L. Hampton, Cloverdale Illawarra Shorthorn Stud, Echunga	25	12/8/39
5. J. M. Bray, Sweethaven Jersey Stud, Langhorne's Creek	26	19/8/39
6. Kybybolite Experimental Farm, Kybybolite	88	1/9/39
7. A. Kelly, Milang	38	21/10/39

Ripening Periods of Wheats.

Requesting a list of the ripening periods of the principal varieties of wheats grown in South Australia, the Lipson Branch of the Agricultural Bureau has been supplied with the following list by Mr. R. C. Scott (Chief Agricultural Adviser). The growth period for each is shown, but under the warm December weather of this State there is not a wide space of time in the ripening of any variety. Consequently the date of flowering is a better guide to the growth period, and what happens under our climatic conditions is that a late wheat has to develop at a faster rate between full bloom and maturity than an earlier wheat.

Aussie	Early
Bena	Late
Bencubbin	Early
Canberra	Early
Currawa	Mid season
Dan	Mid season
Dundee	Mid season
Faun	Early
Federation	Mid season
Felix	Early
Florence	Early
Ford	Mid season
Gallipoli	Late
Ghurka	Late
Gluyas	Early
Joffre	Late
King's White	Early
Late Gluyas	Early
Major	Late
Merridin	Early
Nabawa	Early
Rajah	Late
Ranee	Mid season
Sepoy	Late
Silver Bart	Early
Sultan	Early
Sword	Early
Waratah	Early

The Wool Industry

[C. A. Goddard (Assistant Instructor in Wool Classing, School of Mines.]

[Paper read at the Forty-eighth Congress of the Agricultural Bureau, September, 1937.]

Wool has always been the greatest of Australia's industries, and our prosperity has fluctuated with its ups and downs. Like all primary industries, wool has experienced booms and depressions but even in years of low prices it has returned many millions of pounds sterling to the country. As far as South Australia is concerned, there has been more or less a revolution in respect to our sheep and wool industry in so much as agriculturists have at last realised the importance of sheep and wool, to the extent that, at the present time, there are far more sheep held in farming districts than in the pastoral areas and I venture to predict that during the next decade numbers will be materially increased. In existing conditions it is impossible to separate sheep from wheat growing or general agriculture, because, in the first place, feed that would be otherwise wasted may be profitably used by sheep, and secondly, the fertility of wheat lands cannot be indefinitely retained unless sheep are grazed to return organic nitrogen to the soil.

For the purpose of systematic discussion, this subject may be divided into three divisions as follows:—

I. The chemical and physical characteristics of wool.

II. Production.

III. Marketing.

I. The Chemical and Physical Characteristics of Wool.

Of all the numerous textile fibres, wool is by far the most important to the human race for the following reasons:—

1. Because it is produced relatively cheaply in huge quantities, and its price is such that the great majority of people can use it.

2. It possesses characteristics that make it the best, most healthy, and the most durable fibre for the manufacture of fabrics.

Wool is a complex compound and in its raw state contains a large percentage of impurities comprising—(1) Wool fat; (2) suint (the wool perspiration which is largely composed of potassium carbonate); (3) vegetable matter such as seeds and burrs; (4) earthy matter (sand and dust). When it has been freed of impurities by scouring and sometimes by carbonising to remove vegetable matter, it is then composed of carbon, hydrogen, nitrogen, oxygen, and sulphur in the following proportions:—

Carbon	52.20
Hydrogen	6.90
Nitrogen	18.10
Oxygen	20.30
Sulphur	2.50
	100.00

The physical construction of wool is of more importance than its chemical composition, because the physical characteristics have a very important bearing on the manufacture of wool fabrics.

Although wool has practically the same chemical analysis as hair, it is very different in its construction; while hair has a smooth surface and is straight, wool is wavy or crimped, and has a decided serrated surface. A fibre of wool, when seen under a microscope, may be likened to a fish's skin, or a pine cone. The serrations are made up of flattened, opaque, pointed cells which over-lap one another; they are extremely small and quite invisible to the naked eye and there may be as many as 1,200 to 3,000 to the inch of fibre. This unusual construction of wool is most valuable to the manufacturer, because when wool fibres are being spun into yarn they interlock, which helps to bind the fibres together.

Wool fibres are made up of three layers. (*a*) The outer scales; (*b*) the inner bark or Cortical substance; (*c*) the Medullary or central portion. The external cells are flattened and horny; they form the sheath or bark of the fibre. The second layer of the wool fibre is composed of spindle shaped cells. Upon the density of these cells which form the largest portion of the fibre, the elasticity and trueness of wool depends; moreover, this portion of the fibre is said to have a greater affinity for dying agents than the outer cells. The third or Medullary part of the fibre consists of several layers of oval cells which form the pith or core of the fibre.

The uniformity and compactness of the cells, determine the lustre, firmness, and strength of the wool fibres.

The physical construction of wool is responsible for certain characteristics, all of which have an important bearing on the manufacturing of wool into cloth. The chief characteristics are—

1. *Quality.*—Which refers to the diameter of the fibre. Wool fibres vary tremendously in quality, and the factors causing the wide variation are different breeds, breeding methods, and nutrition. Quality is important because the diameter of the individual fibres has a direct bearing on yarn construction, *i.e.*, the finer the wool the greater the length of yarn that may be spun from a given quantity.

2. *Strength.*—Wool is remarkably strong, in fact the breaking strain of a sound healthy fibre of wool is very little below that of a filament of iron of equal diameter. This characteristic is of great value as it enables wool to pass through a severe processing during its course of manufacture wthout undue waste, and further it gives to woollen fabrics great durability.

3. *Lustre.*—Wool is remarkable for its purity of colour. This factor is of great commercial importance because immense quantities are made up in an undyed condition, *i.e.*, in natural colour or bleached.

4. *Elasticity.*—Elasticity implies that wool fibres will stretch under tension and return to their original dimensions when the tension is relaxed. This characteristic is one of the special features of wool, and is accounted for by the external curvy formation and the internal cellular construction. The great elastictiy of fine merino wool is of great value to the manufacturer, as it aids manufacture, and prevents sagging in the finished article under severe wearing conditions.

5. *Serrations.*—Serrations are the saw-like or rough edges of the wool fibre already mentioned.

6. *Hygroscopic.*—The term Hygroscopic refers to the power of wool to absorb and retain moisture, even under sudden changes in temperature. This characteristic is of great practical use to the manufacturer as it assists the wool through the various processes it passes. It also makes woollen garments most healthy to wear, because the body moisture is at once absorbed and is not given off under sudden changes in climate; thus, there is little danger of chills when woollen garments are worn next to the skin.

7. *Yolk.*—Although yolk can hardly be termed a physical characteristic, it is characteristic to wool. It is a very important factor in the production of healthy wool as it lubricates the fibres and prevents cotting. It varies in quantity in the different breeds of sheep. Yolk will emulsify in cold weather but the animal fats or suint will not; therefore, wool cannot be completely scoured in cold water.

II. Wool Production.

The sheep is the direct unit of production of wool; it, in turn, obtains its power of production from fodder. It will be seen, therefore, that there are two main factors in wool production:—

(1) The breed—cross or type of sheep.
(2) Nutrition.

(1) BREEDS AND CROSSES.

There are many different breeds of sheep in the world, and they all vary in respect to wool production. In Australia, we are concerned chiefly with Merino, and a few of the most important British breeds.

MERINO TYPES.

From a wool-producing aspect the Merino must always hold pride of place; even so, there is a very great difference from a wool-producing point of view between the different types. Thus we find that the small, slowly maturing type produces a super fine wool of very high value, but the fleece weights from this class are always very low, and it cannot be generally regarded as a profitable type. The medium

Merino is found in great numbers in Australia, especially in New South Wales. It produces a wool of medium to fine quality, cuts fair fleece weights and must be regarded as a valuable wool-producing sheep. The large plain-bodied type is peculiar to our pastoral areas, and when constitution and its power to produce tremendous fleece weights are taken into consideration, it must be regarded as the most valuable wool-producing sheep in the world. It is a type that farmers in wheat-growing districts should make every endeavour to keep, as besides being a splendid wool sheep, the ewes make excellent mothers for cross-bred lambs.

BRITISH BREEDS.

Of the British breeds, the various long wools are the only ones that can be seriously considered from a wool-producing aspect and they vary considerably in this respect.

The Lincoln is the heaviest wool producer and the wool, although very coarse (average Lincoln being 36s quality) it is particularly strong and for certain purposes highly prized.

The English Leicester ranks next in regard to fleece weights and the quality is 4 counts finer than the Lincoln, and for cross breeding for wool production in localities that suit the breed, it must be regarded as the best of the long wools.

Border Leicester and Romney Marsh are about the same so far as wool production is concerned, except that the Border Leicester wool is much truer than the Romney. The fleece weights from these two breeds cannot, however, be compared with the Lincoln and English Leicester.

When any of these breeds are crossed with the Merino ewes the half-breed produces useful wool which is always in demand.

(2) NUTRITION.

Nutrition has a special bearing on all the important manufacturing characteristics of wool, and it must be regarded as one of the most influential factors in production. It is really a separate study and I only wish to refer to it in passing in order to point out the importance of correct and regular feeding and to emphasise the necessity of conservation of fodder for sheep, as well as to stress the advantages of supplying a good ration to ewes during the gestation period. During this time wool suffers in quality, strength and quantity, unless the ewes receive sufficient nutrition to develop the foetus and grow a healthy fleece of wool.

III. Marketing.

There are many problems in connection with the marketing of our wool clip. This also applies to any primary product because the production is spread over such a wide area and there are so many producers. In secondary industries marketing can be orderly because production is usually confined to definite centres and controlled by comparatively few men or corporations.

The preparation of wool for market is in the hands of the producers; the actual selling of it is the concern of the wool brokers, and producers should realise that unless they do their part the broker cannot obtain the best possible values for them.

PREPARING WOOL FOR MARKET.

Large clips are usually prepared for market by qualified wool classers and, therefore, it is not necessary for me to refer to them.

As in the case of other primary products, it is necessary that the grading of wool should be done on well-defined principles, because it is the only way in which any standardisation can be obtained, and the principles employed must be those which have an economic bearing on the conversion of wool into fabrics. The important factors in respect of the raw material in manufacture are:—

(1) *The length* of the staple, because this has a direct bearing on some of the most important processes.

(2) *The strength.*—This factor, like length, affects economic processing.

(3) *Quality*, which is the basis of wool values, and has a direct bearing on yarn construction.

(4) *Condition.*—All wool is valued on a clean basis. Condition and its various forms have a great influence on wool valuation and manufacture.

(5) *Colour* is a special consideration because immense quantities of wool are manufactured in natural colour; therefore evenness in colour is essential.

It will therefore be seen that if wool is to be graded to meet the requirements of the trade it must be graded on the five factors or principles shown above. Only then will the different grades be even in type, usefulness and value.

FLEECE TREATMENT.

All fleeces contain a percentage of wool inferior to the major part of the fleece, and they must be trimmed to remove these inferior portions. This work must be regarded as being of first importance, as, unless the fleeces are correctly treated the classing will be a failure. Backing must also be considered under this heading.

Skirting the Fleece.

The first essential in accurate skirting is a suitable wool table 10ft. x 5ft. I recommend a table of these dimensions because it is necessary to have one large enough to enable the fleece to be spread on it without the edges falling over the sides. When the fleece is spread on the table the skirting consists of removing the inferior portions from the head, such as top-knots, matted jaw pieces, and any other inferior wool. From the shoulders, the discoloured points are removed and the small bunch of sweaty ends from behind the shoulders. Next inspect the sides and remove any inferior wool; very little skirting is required on this part till the thigh is reached where some black sweaty edges are usually found. Next remove the short discoloured points from the hind legs and, last of all, all stain and dags from the britch. Care must be taken not to remove any good wool when skirting because this reduces a portion of good clean wool to a lower type than fleece wool. At the same time the skirting must be thorough because inferior wool, when left on the fleece, reduces its type. Burr should be removed when it can be done by a reasonably heavy skirting, but when a fleece is very burry light skirting only is required.

Backing.

When sheep are run on fallowed land they gather quite a lot of sand and dust in the back portion of their fleeces, the presence of which reduces its value tremendously. The extent to which backing pays has always been a contentious question, but if it is done only to separate the inferior wool from the superior, and so raise the type of the fleece, it must be a correct treatment. It should be remembered, however, that it is not a bit of good only half doing it, as so many farmers do. It would be far better to have it all in than remove only a part of it.

Oddments.

The oddments of a clip consist of the skirtings, bellies, backs, locks and stained pieces. All these different types have different values, and they need some grading to obtain the best price for them. With small clips there is only a small parcel of each of the oddments, with the exception of backs; therefore it is impossible to make bale lines of each. They should all be picked over however, in the following way:—

The skirtings should be examined and all urine stains and dags removed. The bellies need a little skirting to remove the short, heavy, brisket piece. The locks should be well shaken to remove dags. Wet stains should be well dried before packing. When the oddments have received the necessary treatment they can be packed into one bale, providing a light cap is placed between each description. There is usually sufficient sandy back wool to fill a bale.

Fleece Classes.

The number of fleece classes that can be made to advantage will depend on the number of sheep shorn. In South Australia the average size of the farm flock consists of approximately 300 grown sheep which represent about 7 bales of fleece wool. It is not advisable to make more star lots than can be helped, and as a star lot is represented by any number of bales under 4, it is obvious that only one main class above a star lot can be made from a clip of 7 bales. The method of grading this small clip is as follows.

Reject all the out-type fleeces, such as extra long ones, extra short, very heavy, and discoloured fleeces, unsound ones, and very strong ones. A good average farm clip should not provide more than 15 per cent. of cull fleeces or 45 which represents one bale. In this way 6 bales that are reasonably even in length, strength, quality, colour, and condition are made well above a star lot, even enough in the main essentials to command good competition at the sales. As this line may contain fleeces from sheep of different ages and sexes it is advisable to brand it AAMo. The one bale of out-type fleeces would be branded A.Mo and consigned to the bag pool for reclassing.

LARGER FARM CLIPS.

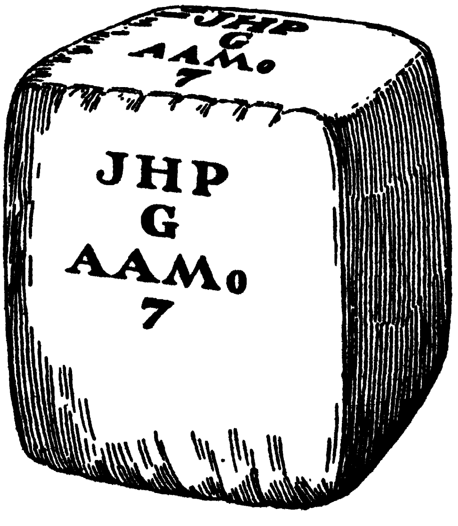
As clips increase in size the classing can be extended, the amount of extension depending on the size of the clip.

BALING AND BRANDING.

Wool is a valuable product and it should be sent to market neatly baled and branded.

BOX PRESSING.

Most farm clips are baled with a box press. The fleeces should be placed in alternate layers of six fleeces and special attention given to the treading down of the bottom layers to make the bale nice and firm. In finishing off, sufficient wool should be placed on the top to fill out the corners and make the top tight. Bales, when pressed, need careful branding, and it should be done with stencil plates in the way recommended by wool brokers, that is on the cap and the front side as shown in the accompanying sketch. Never, in any circumstances, should a broker's name be placed on the bales; many farmers do this, which is an unnecessary disfigurement.



All that is now left for the grower is to consign the wool to the broker for sale. A covering letter should be sent explaining just how the wool has been prepared and also giving the numbers of the bales that contain the different classes, especially those that should go to the bag pool.

SELLING WOOL.

The selling of wool is a highly specialised business. It is sold by auction and is therefore subject to the vagaries of fashions and varying competition. These factors make fluctuations inevitable, even in the same sale. This is often overlooked by wool growers, many of whom believe that prices for different types are more or less standardised for the sale which is in operation. In any auction sale, bargains are often obtained by the buyer, but this is compensated for by the fact that prices in excess of market values are frequently obtained by growers. Competition is the mother of trade and growers should do everything in their power to present their wool for sale in such a way that the best possible competition is obtained. In the same way it is the duty of selling brokers to show the wool to the best advantage.

METHOD OF MARKETING.

Sales dates are fixed and allocations arranged by the Wool Council some months before the selling season is due to open. An important point is that wool is offered for sale in the order in which it arrives into store; this rule is strictly adhered to.

WEIGHING THE WOOL.

All wool as it arrives into store is weighed on special scales which are officially tested every day. The date of entry and the weights are recorded on sheets and the wool is then stacked to wait its turn to be offered by auction. When sufficient wool has arrived to fill the allocation for the next sale it is closed and later arrivals must wait for future sales.

CATALOGUING.

A rough calatogue is first arranged and the show floor plotted according to it; later, a catalogue is printed showing every line, its description and the number of bales it contains.

SHOW BALES.

Only a percentage of the bales of any line of classed wool above a star lot is shown, but every bale of an unclassed clip and of star lots must be set out on the show floor. The following percentages are exhibited:—

1, 2, or 3 bales (a star lot) all are shown.
4 bale lots, 2 shown, one capped.
5 to 9 bale lots, 3 shown, one capped.
10 to 14 bale lots, 4 shown, two capped.
15 to 24 bale lots, 5 shown, three capped.

When the floor is completed the bales are opened and capped and the wool is pulled ready for valuation, catalogues are given to the buyers and they proceed to value any lots that suit their requirements. The brokers' experts value every lot and a priced catalogue is prepared which the auctioneer takes to the selling box as a guide. He is then in a position to pass lots when he considers that the bidding is not up to market value. In this priced catalogue any reserves that may have been made by owners are also marked.

VALUING WOOL.

There are several methods of valuing wool, some of which are rather intricate, such as the TEAR method which consists of judging not only the yield, but also combing results. It is sufficient, however, for the layman to know that wool is always valued on its clean scoured basis, *i.e.*, the actual wool is valued, and not the yolk, and foreign matter it contains. Buyers are supplied with limits by their principals, the limits being based on the ruling price of prepared tops of different qualities. The raw wool must be bought *ex* Store, Australia, to enable the top maker to sell at a profit at the ruling quotation. Therefore, all transit and conversion costs must be taken into consideration when preparing a limit. The buyer, when valuing, first decides the quality, then proceeds to estimate the yield. *For example*: Suppose the limit is fixed at 34d. after allowing for the various costs. The yield is 46 per cent., *i.e.*, the wool will loose 54 per cent. in the scour, then the greasy price would be 46 per cent. of 34d., thus:

$$\frac{34 \text{ limit x } 46\% \text{ yield}}{100} = 15.64 \text{ or } 15\tfrac{1}{2}\text{d.}$$

per lb.

It will be seen from the above that the higher the yield, providing the same limit is employed, the higher the price in the grease. It should also be quite plain that farmers do not get paid for sand and dust as so many of them appear to believe. Wool buyers need a special training. It is highly specialised work, and quite beyond the powers of an ordinary layman, no matter how good a wool grower he may be.

SELLING COSTS.

To many, the charges appear excessive, but in fairness to the wool brokers, it must be remembered that marketing of wool entails an immense amount of work. Highly trained experts must be retained and the clerical work involved in running a wool sale is tremendous, and large gangs of labourers must also be employed. The regular charges are as follows:—

Commission not over £200, 3 per cent; £200 to £500, 2 per cent.; over £500, 1½ per cent.

"Receiving," "Warehousing," "Weighing," "Sampling," "Advertising," "Cataloguing," and "Repacking sample bales," one farthing per lb.

Interlotting, 1s. 6d. per bale.

Insurance, at 2s. 6d. per cwt., less 10 per cent. rebate.

Bulking mixed bales or bags, that is, re-classing—Wools realising more than 2d. per lb., ½d. per lb. When wools realise less than 2d., ¼d. per lb.

SOME COMMON TERMS USED IN THE TRADE.

Interlotting means lotting together small lines of wool "star lots," which are of even type and value, and so making a big lot from several small ones.

Bulking.—This means the pooling of wool from mixed bales and bags and so making bale lots out of small parcels.

60's Quality.—This refers to a wool of a certain quality; and a pound of combed tops made from it will spin 60 hanks of single yarn each 560 yards long.

Top-Makers.—Refers to a rather inferior type of wool which, when combed produces a considerable amount of waste.

Spinners Type.—Refers to a first class combing wool with little or no fault.

Condition.—Refers to the natural yolk and foreign matter that wool contains.

Light Weight Bales.—Refers to bales that are below minimum weights, which are:—(1) Greasy Merino, 250lbs; (2) greasy crossbred, 225lbs.; (3) lambs, 200lbs.; (4) scoured, all types, 150lbs.

Counts.—One often hears counts misquoted. It should, therefore, be of interest to quote the recognised counts in the worsted trade and the breeds that represent them.

Breed.	Count.
Coarse Lincoln	32's
Average Lincoln	36's
English Leicester	40's
Border Leicester, Romney Marsh, and average Lincoln and Merino-Crossbred	46's
Dorset Horn-Shropshire and Fine Crossbred	50's
Southdown, Corriedale and Come-back	56's
Fine Corriedale type or very strong Merino and Ryeland ..	58's
Strong Merino	60's
Average Merino	64's
Fine Merino	70's
Super Fine Merino	80's and upwards.

Conclusion.

In conclusion I wish to stress the tremendous importance of the wool industry to the farming community of South Australia, who should not subordinate wool-growing to other activities, such as the breeding of crossbred lambs. Wool exports are worth approximately 10 times more than lambs, and what is more, wool exports are not subject to quotas. Lamb breeding and wool should go hand-in-hand in the majority of our farming districts. The lambs should be bred from ewes that are good wool producers, and all cross-bred lambs should be disposed of as lambs and not be kept for shearing. This is, of course, every farmer's aim. Unfortunately, however, many crossbred ewes produced by British Down breeds are finding their way into the breeding flock.

Another point I wish to stress is that there is more scope for improvement in quantity and quality in the farm wool clip than in most other primary industries. For example, by better breeding methods and by conservation of fodder to provide concentrates for the lean period, and also improvement in the general management of the farm flock, I venture to say that the value of the total farm clip could be raised by 20 per cent., and this would not necessarily mean great additional outlay, but rather more care and attention to the flock.

As far as one can judge from overseas reports regarding supply and demand, wool prices should remain at a profitable level for some time to come, but one does not however, attempt to forecast prices, because there are so many outside influences that affect them.

Washing Superphosphate Bags.

The Director of Chemistry (Mr. C. E. Chapman), recently stated, in reply to a question asked at the Cowell Bureau Conference, that either fresh or salt water may be used for the purpose of washing superphosphate bags. Neither should have an injurious action on the jute, but naturally where fresh water was available it should be used. To aid in the removal of acidity, the addition of a small amount of washing soda—say 1 teaspoonful to the gallon—might be added with advantage, but this was not essential. Sufficient water should be used to avoid concentration of acid in the washing liquor.

Locusts and Grasshoppers in South Australia—Some Records of Past Outbreaks

[By H. G. ANDREWARTHA, M.Agr.Sc.]

Outbreaks of the Black-tipped locust (*Chortoicetes terminifera* Walk) and the wandering grasshopper (*Austroicetes jungi* Brancsk) have occurred from time to time in South Australia since the colony was founded in 1836. Davidson (1) discusses certain of the recorded outbreaks. The records given below have been taken *verbatim* from Hunt (2).

In the original no reference was made to the species involved in the different outbreaks; but with our present knowledge it is possible to make a fairly well-informed guess as to the species concerned. For example, *Austroicetes jungi* is present in the active stages from August to November; there is only one generation each year. The areas in which it is likely to occur as a plague are definitely restricted; the adults do not migrate over great distances. On the other hand *Chortoicetes terminifera* may pass through more than one generation in a year, and occur at any time when conditions of temperature and humidity are satisfactory for development. The areas in which plagues are likely to develop lie north of the wheat belt, but once a plague has developed the possible invasion areas include practically the whole State (*vide* Davidson (1)). In the light of this knowledge it has been possible to classify the records given below.

Those marked:—(1) probably refer to *C. terminifera.*
(2) doubtfully refer to *C. terminifera.*
(3) probably refer to *A. jungi.*

Several of the records refer to places in the Northern Territory. At the time these records were compiled the Northern Territory formed part of South Australia. The species involved in these cases may be *Chortoicetes terminifera* or *Gastrimargus musicus* Fabr.

1844 (1) 10th-12th November.—North Adelaide was visited by swarms of destructive locusts which denuded the vines of leaves and consumed the melon crop.

1846 (1) 9th October.—Near Adelaide locusts appeared in great numbers, parts of the ground being thickly covered with them. They destroyed the melon crop.

(1) 17th November, Adelaide.—Locusts were extremely numerous and greatly damaged the gardens.

1855 (1) 8th November, Adelaide.—Many gardens were devastated by locusts.

1869 (1) 6th February.—Grasshoppers were doing great damage in various parts of the State.

1871 (1) 19th December, Adelaide.—Swarms of locusts devastated the gardens. Glenelg.—Locusts arrived in enormous numbers, and in a short space of time vegetables, the leaves of trees, and the grass had disappeared.

1872 (1) 15th March.—The northern districts were invaded by hosts of grasshoppers and locusts, and in two days enormous damage to vegetation resulted.

(1) 11th November.—Hosts of locusts devoured potatoes and wheat at Port Lincoln; they travelled from north to south, moving in groups and destroying all the growths *en route*.

(2) 19th November, Truro and Monarto.—Myriads of locusts greatly damaged the crops. Hummocks.—Locusts consumed stores of water and the crops.

(2) Kadina.—Swarms of locusts stripped the fruit trees, bushes, shrubs, and plants.

(2) 26th November.—Locusts ravaged the Lower Murray, Port Wakefield, and Mount Bryan Flat districts.

1873 (1) 20th January, Mount Gambier.—Myriads of grasshoppers had stripped the gardens.

(1) 6th-13th February, Naracoorte.—Locusts wrought great havoc amongst vegetation.

(1) 19th March, Meadows and Auburn.—Locusts had consumed all vegetation.

(1) 2nd April, Waterloo.—Grasshoppers stripped vines and fruit trees of their leaves, and even the young wood on the trees was eaten off; paddocks were made bare of grass.

(2) 10th November.—Locusts wrought havoc among the grass, leaves of trees, and vegetables in various parts of the settled areas.

1874 (2) 16th November.—In the river districts, grasshoppers consumed all pastoral vegetation, and destroyed flower and vegetable gardens.

(3) 23rd November, Kooringa.—Locusts entered houses, destroyed bed and window curtains, and also denuded the country of every vestige of feed.

(3) 26th November.—The down train from the Burra met with swarms of locusts, which were spread on the permanent way so thickly the engine wheels could not grip the rails.

1875 (1) 20th December, Adelaide.—Myriads of locusts invaded the metropolis and consumed most of the grass in the parks. From miles beyond the Burra to the South side of Gawler the winged host was in evidence in unprecedented numbers.

1877 (3) December.—Grasshoppers caused havoc amongst the crops in the Northern areas.

1882 (3) 30th October, Booleroo Whim.—Grasshoppers were very numerous and did much damage among the wheat crops.

1885 (?) 17th August (approx.), Powell Creek.—Large swarms of grasshoppers observed on four consecutive days travelling southward.

1890 (1) 24th January, Yunta.—A plague of grasshoppers consumed the vegetation.

1896 (3) 26th October.—Between Quorn and Hammond grasshoppers appeared in myriads and destroyed the small amount of vegetation that had survived the drought.

1910 (3) September.—Grasshoppers did some damage to the crops on the extreme West Coast.

1911 (3) September, Nunong.—Grasshoppers plentiful.

1912 (?) April.—In the Territory, at Brock's Creek and Katherine grasshoppers were very destructive.
(3) October.—Grasshoppers destructive at Terowie and Nunong.
(2) November.—During the early part of the month, Mannahill and Koonamore were visited by a destructive plague of grasshoppers.
1913 (?) February, Northern Territory.—Borroloola suffered from several visitations of locusts.
1913 (?) March, Katherine and Daly Waters.—Grasshoppers were very destructive.
(?) April, Brock's Creek.—Grasshoppers were numerous.
(3) November, Telowie and Ulooloo.—Great numbers of grasshoppers appeared.
1917 (1) January.—Grasshoppers were very numerous in the North East.
(1) February, Boolcoomatta.—Grasshoppers in myriads.
(1) March.—Grasshoppers very numerous in the Northern districts and in the Murray Valley.
(1) April.—Grasshopper pest in the North East.
(1) April, Eudunda.—Grass in parts of district consumed by grasshoppers.

REFERENCES.

(1) Davidson, J. (1936).—On the Ecology of the Black-tipped Locust in South Australia. Tran. Roy. Soc. S.A. Vol. 60: 137-152.
(2) Hunt, H. A. (1918).—Results of Rainfall Observations made in South Australia for all the Years of Record up to 1917. Commonwealth of Australia, Bureau of Meteorology, 1918, 201-203.

Hills Branches Field Day

Through the courtesy of the Hon. R. T. Melrose members of the Hills Branches were afforded the opportunity of holding a Field Day on his "Rosebank" Mount Pleasant property on 27th October, instead of the usual Bureau Conference. Delegates to the number of about 250 from the Ironbank, Blackwood, Keyneton, Kybybolite, Adelaide, Jervois, Lobethal, Lenswood, Springton, Balhannah, Kangarilla, Cudlee Creek, and Cambrai Branches were welcomed by the Chairman.

Mr. J. H. Buckley (Chairman of the Mount Pleasant Branch) welcomed the visitors, and Mr. P. J. Baily, member Advisory Board of Agriculture, opened the proceedings.

During the morning Mr. R. Baker, of the Roseworthy Agricultural College, spoke on Pig Management, and Mr. H. B. Barlow (Chief Dairy Adviser), gave a demonstration of dehorning. After luncheon, delegates listened to the following addresses:—"Fat Lambs" and "Beef Cattle," Mr. W. J. Spafford (Director of Agriculture); "Pasture Management," Mr. R. C. Scott (Chief Agricultural Adviser); Dr. A. R. Callaghan of Roseworthy Agricultural College and Dr. A. E. Richardson and Professor W. A. Prescott, of the Waite Institute, were also present.

Members of the party were given the opportunity of seeing the staff of "Rosebank" making concrete fencing posts, baling hay, crutching sheep, and Mr. Melrose accompanied the visitors, when they inspected a series of oat variety plots that had been sown in preparation for the land to carry lucerne next year. Delegates inspected Mr. Melrose's beautiful garden and aviaries.

It was decided that the 1938 Conference should be held at Kangarilla.

Mr. W. K. Johns capably carried out the secretarial duties of the Field Day.

Orchard, Vineyard and Miscellaneous Crop Statistics, 1936-37

By A. W. Bowden, Government Statist.

(Figures in parentheses refer to previous season.)

1. ORCHARDS.

1. *Acreage.*—29,755 (29,122) acres, increase 633 acres; trees of bearing age 25,503 (25,320) acres. Approximately 200 acres grubbed or died out—mostly in Counties Adelaide 130 acres, Gawler 24 acres, and Flinders 14 acres. New plantings were 833 acres, chiefly in Counties Adelaide 658 acres, Hamley 46 acres, Light 36 acres, Victoria 30 acres, and Hindmarsh 20 acres.

2. *Production.*—Generally speaking the crops were heavier than the previous year. (*a*) Apples, 841,504 bush. (939,240bush.), decrease 97,736bush. (*b*) Oranges (calendar year 1936) 654,889bush. (645,291bush.) increase 9,598bush., surpassed the record established the previous year. (*c*) Pears, 242,336bush. (228,223bush.) increase 14,113bush. (*d*) Apricots, 357,022bush. (381,404 bush.) decrease 24,382bush. (*e*) Plums and prunes, 168,017bush. (157,515bush.) increase 10,502bush. (*f*) Peaches, 146,399bush. (134,586bush.) increase 11,813bush.

Details for other fruit are shown in accompanying table.

2. VINEYARDS.

1. *Acreage.*—56,122 (54,219) acres, increase 1,903 acres; vines of bearing age 52,679 (51,680) acres. About 135 acres grubbed or died out, but this was far more than counterbalanced by new plantings—about 2,038 acres—chiefly in Counties Adelaide 680 acres, Hamley 573 acres, Light 367 acres, Stanley 172 acres, Albert 44 acres, Sturt 41 acres, and Hindmarsh 34 acres.

The acreage was described as follows:—For winemaking 35,116 (33,851) acres, drying 20,694 (20,057) acres, and table 312 (311) acres.

2. *Total Grape Yield.*—148,579 (132,559) tons, increase 16,020 tons; average per acre of bearing age 2.82 (2.59) tons. For winemaking 80,484 (72,554) tons, drying 67,513 (59,458) tons, and table 582 (547) tons.

3. *Wine Made.* — 15,026,502galls. (13,023,587galls), increase 2,002,915galls. Fortified beverage wine 6,115,515galls. (6,521,650galls.), unfortified 1,318,655galls. (1,233,972galls.), and distillation 7,592,332galls. (5,277,965galls.).

3. DRIED FRUITS.

1. *Currants.*—161,858cwts. (117,415cwts.) increase 44,443cwts.

2. *Raisins.*—Sultanas 189,579cwts. (173,967cwts.), increase 15,612cwts. Other raisins 38,052cwts. (36,199cwts.), increase 1,853cwts.

Note.—1,068 tons of dried grapes were used in making wine.

3. *Other Dried Fruits.*—Apricots 20,555cwts. (21,183cwts.), plums and prunes 9,266cwts. (9,915cwts.), peaches, pears, apples, &c. 12,248cwts (9,977cwts.).

4. MISCELLANEOUS.

Market gardens (including green peas 1,040 acres, 2,539 (2,614) acres; pumpkins and melons 367 (322) acres, 2,020 (1,932) tons; tomatoes 558 (622) acres, 199,728bush. (216,525bush.); potatoes 4,657 (4,612) acres, 20,923 (19,257) tons; onions 507 (432) acres, 3,694 (3,257) tons; other root crops 729 (802) acres; nurseries 193, (158) acres.

5. OVERSEA EXPORTS.

The value of the total oversea exports of the products of vineyards and orchards for the year 1936-37 was £1,632,662 (£1,628,841), increase £3,821, the principal items being dried fruits £513,844 (£569,302), wine £955,033 (£870,710), apples £85,858 (£143,939). Complete details of Interstate exports are not available, but annually about £600,000 of wine and brandy are exported to the other States.

Varieties of Wheat Sown, Season 1936-37.

1. The Government Statist reports that 145 (157) varieties of wheat were sown for the Wheat Crop of the Season 1936-37. The total acreage shown for Grain, Hay and Fodder was 3,307,689 (3,210,238) of which the varieties were not specified for 100,170 (80,779) acres.

2. Particulars of the 18 most popular varieties are given at foot hereof. The order of the first six varieties remains unchanged. Ranee again heads the list with a percentage of 22.57 as against 18.09 in 1935-36, an increased percentage of 4.48; Nabawa ranks second on the list, its percentage being 15.55 (17.56), with Sword, Waratah, Gluyas, and Ford following in that order. A feature is the growing popularity of Sword, Merredin, Bencubbin, and Dundee. Bencubbin has risen from 20th to 10th position, and Dundee from 30th to 13th position. Nabawa, Waratah, Gluyas, Ford, Ghurka, Gallipoli, Late Gluyas, and Currawa are steadily declining. Federation is also falling back and has been displaced from the 18 leading varieties. For the first time Florence and Quality, which are identical, are shown as one variety.

3. The leading varieties favoured in each of the divisions and their percentages to the total were:—

Central—Sword 22, Ranee 21, Nabawa 12, Ford 7, Waratah 6, Dan 3.

Lower North—Ranee 28, Sword 13, Nabawa 11, Ford 6, Waratah 5, Ghurka 4.

Upper North—Ranee 51, Nabawa 15, Sword 4, Gluyas 5, Federation 3, Waratah 3.

South Eastern—Ghurka 33, Ranee 18, Gallipoli 14, Ford 8, Sword 7, Nabawa 5.

Western—Nabawa 22, Gluyas 11, Ranee 11, Sword 8, Late Gluyas 7, Waratah 7.

Murray Mallee—Ranee 19, Nabawa 17, Sword 10, Gallipoli 7, Gluyas 5, Ghurka 4.

4. Eighteen leading varieties of wheat sown 1936-37, compared with 1935-36:—

Kind of Wheat.	Total Area Sown for Grain, Hay, &c.		Percentage to Total.		Relative Position.	
	1936-37.	1935-36.	1936-37.	1935-36.	1936-37.	1935-36.
Ranee	746,442	580,833	22·57	18·09	1	1
Nabawa	514,498	563,652	15·55	17·56	2	2
Sword	390,941	360,686	11·82	11·23	3	3
Waratah	179,167	221,607	5·42	6·90	4	4
Gluyas	177,711	191,559	5·37	5·97	5	5
Ford	170,673	175,439	5·16	5·46	6	6
Ghurka	98,689	122,484	2·98	3·82	7	8
Gallipoli	98,562	141,999	2·98	4·42	8	7
Late Gluyas	78,699	86,390	2·38	2·69	9	9
Bencubbin	76,208	21,199	2·30	0·66	10	20
Merredin	61,048	55,033	1·85	1·71	11	11
Florence (including Quality)	59,810	68,930	1·81	2·15	12	10
Dundee	56,485	8,548	1·71	0·27	13	30
Dan	52,984	51,969	1·60	1·62	14	12
Aussie	47,030	48,807	1·42	1·53	15	13
Currawa	36,982	46,031	1·12	1·43	16	14
Felix	34,154	33,697	1·03	1·05	17	16
Sultan	33,809	34,282	1·02	1·07	18	15
Other and unspecified	393,797	397,093	11·91	12·37	—	—
	3,307,689	3,210,238	100·00	100·00	—	—

Agricultural Bureau of South Australia

Eyre's Peninsula Conference

On October 18, 20, and 22, Conferences were held respectively at Cowell (Eastern Eyre's Peninsula), Ungarra (Lower), and Poochera (Central). Each Conference was opened by the Hon. A. L. McEwin, M.L.C. (representing the Advisory Board of Agriculture), and was also attended by the Director of Agriculture (Mr. W. J. Spafford) and other officers. Mr. C. T. McKenna (Veterinary Officer of the Stock and Brands Department) gave a practical demonstration of inoculating a sheep for Entero-Toxaemia, and addressed the Conferences on "Itch on Horses" and other stock complaints.

At the evening sessions Mr. Spafford gave a lantern lecture on "A Tour of the Southern Hemisphere."

Cowell Conference

The Cowell Conference was organised by the Miltalie Branch (Mr. H. L. Ramsey, Secretary), and Mr. J. P. Story presided.

The following papers were read by members of Branches:—"Farming Our Light Sandy Soils" (Mr. A. A. Jericho, Balumbah), "Breeding Merino Sheep" (Mr. R. P. Smith, Miltalie).

Resolutions were carried as under:—

That the Government be asked to consider further deep boring in the County of Buxton.

That Stock Salesmen—Goldsbrough Mort & Co. Ltd., and Elder Smith & Co. Ltd.—be asked to re-consider establishing periodical markets at a central place in the County of Jervois.

That next Conference be held at Cleve under the auspices of the Yadnarie Branch.

Ungarra Conference

The Ungarra Branch was responsible for the arrangements of the Lower Eyre's Peninsula Conference. Mr. W. Treasure presided and Mr. W. G. Gordon acted as Conference Secretary.

Papers were read by Mr. R. R. Wilson (Yeelanna) on "Wheat and Barley Production," Mr. F. G. Gardner (Koppio) on "The Forge on the Farm," and Mr. T. Gardner (Koppio), on "Wool Production." Messrs. W. G. Gordon and W. Roediger debated the "Advantages and Disadvantages of Farm Life."

The Conference carried the following resolutions:—

That this Conference affirms its fullest confidence in the work of the Roseworthy Agricultural College.

That the next Conference be held at Yeelanna.

Poochera Conference

There were nine Branches represented at the Poochera Conference, when Mr. C. O. Bohlin presided and Mr. F. R. Joy undertook the Secretarial duties.

Members of Branches read papers as follows:—Mr. W. A. Gosling (Poochera), "Re-allotting of Deserted Farms"; Mr. W. E. Stone (Petina), "How to Make a Living on a 2,000-Acre Farm"; Mr. J. Moroney (Chandada), "Extermination of Rabbits"; Mr. C. L. Bagley (Poochera), "Pasture Improvement"; Mr. G. Wheal (Poochera), "Sheep on a West Coast Farm"; Mr. E. G. Voumard (Poochera), "The Care of the Horse"; Mr. R. J. Evans (Chandada), "Application of Producer Gas to the Farm Tractor"; Mr. O. J. Murphy (Warramboo), "Problems of Wheat-Growing in Central Eyre's Peninsula.

Several resolutions were carried:—That land in this district be allotted on a basis of 2,500 acres of arable land; that this Conference requests that steps be taken by the Advisory Board of Agriculture to ensure the eradication of vermin on blocks held by the Lands Department and Banks by those bodies; that the Minnipa Farm be used as a seed wheat farm similar to the Turretfield Farm; that Eyre's Peninsula be not exempted from the operations under the Draught Stallions Act; that a wool instructor be appointed to the staff of the Department of Agriculture; that superphosphate manufacturers resort to hand-sewing of bags; that the Government be asked to allow a farmer having only one motor vehicle, whether it be a car or truck, to register it under primary producer's licence; that a certain amount of land be put aside for pasture experiments at the Minnipa Experimental Farm; that the next Conference be held at Wudinna before the Royal Show.

Non-Irrigated Fruit Districts Conference

The Conference of Branches in the Non-Irrigated Districts of the State was held at McLaren Flat on 2nd November. Mr. P. T. Wait presided. Mr. H. N. Wicks represented the Advisory Board of Agriculture, and Messrs. W. J. Spafford (Director of Agriculture), A. G. Strickland (Chief Horticulturist) and other officers of the Department of Agriculture attended.

Papers were read by Mr. F. B. Wilson (McLaren Flat) on "Marketing our Dried Fruits — Impressions during a World Tour"; Mr. H. C. Platts (McLaren Flat), "Dehydration of Fruit"; Mr. R. Guthrie (Blewitt Springs), "Tobacco Culture at Blewitt Springs."

Mr. C. F. Anderson (Chief Poultry Adviser) addressed the Conference on "The Poultry Industry."

Several questions relating to orchard and vineyard practices were answered by Departmental Officers.

The following resolutions were carried: "That the compulsory spraying of fruit trees should be enforced, especially isolated trees."

"That the Advisory Board be requested to arrange a Field Day in conjunction with a Conference next year at a suitable time and place."

Advisory Board of Agriculture

The monthly meeting of the Advisory Board of Agriculture was held on Thursday, 28th October, there being present:—Sir Wallace Sandford, K.B. (Chairman), Messrs. S. Shepherd (Vice Chairman), F. Coleman, P. J. Baily, H. N. Wicks, A. M. Dawkins, C. A. Loxton, W. J. Spafford, Prof. A. J. Perkins, Dr. A. E. V. Richardson, and H. C. Pritchard (Secretary). An apology was received from Mr. A. J. A. Koch. A cordial welcome was extended to Sir Wallace Sandford by the members of the Board on his return from abroad.

Goodwill Message to the Governor.—The Secretary reported that in accordance with the wishes of Congress, a message of goodwill from delegates had been transmitted to His Excellency the Governor and to Lady Dugan, through the Lieutenant-Governor.

Personnel of Board.—The Hon. Minister re-appointed the following members for 2 years commencing 1st July, 1937:—Sir

Wallace Sandford, K.B., Hon. A. L. McEwin, M.L.C., Dr. Richardson, Messrs. R. H. Martin, S. Shepherd, and J. B. Murdoch, all of whom accepted the Minister's invitation to be re-appointed. The Minister accepted the resignation of Mr. Geo. Jeffrey. The Board recorded its keenest appreciation of the services rendered by Mr. Jeffrey to the agricultural interests of the State and to the Board during his long term as a member.

New Branches.—Approval was given to the formation of Branches at Cudlee Creek and Wirreanda, with the following as foundation members:—Wirreanda—H. R. Harrold, S. Reynolds, A. McInnes, J. Bennie, R. Webb, T. Cullinan, M. Buckley, J. Lynch, O. P. Walladge, J. Marron, A. J. Harrold, J. Murphy, M. Reynolds, H. W. McArthur, P. P. Tierney, S. G. Harrold, H. Pyman, Carl Pyman; Cudlee Creek—J. T. Osborn, D. W. Hannaford, W. B. Hannaford, R. B. Pritchard, J. Pritchard, P. J. Warner, O. Pritchard, E. Hannaford, E. Jarman, S. M. James, G. S. James, Max. Hannaford, T. Pryzgoda, W. C. Newman, E. Newman, H. S. Hobbs, J. G. Simmons, A. L. Pitman, W. H. Connor, W. Duthie, M. Stone, E. G. R. Ludwig, M. Ludwig, C. L. Newman, S. P. Newman, G. L. Newman, V. E. L. Newman, W. H. Hannaford, J. Cooke, P. J. Cooke.

New Members.—The following names were approved for addition to the rolls of existing Branches:—Alma—M. McKenzie, R. M. McKenzie; Auburn Women's—Mrs. R. Milway, Mrs. L. McEvoy, Mrs. L. Dennison; Balaklava—Bruce Moody, F. B. Wreford; Balumbah Women's—Mrs. Geo. F. Stubing; Barmera—C. T. Leaney, A. J. Tonkin, D. Thomas, A. Ebbs; Beetaloo Valley—W. Robinson, D. Cawthorn, C. Watson; Beetaloo Valley Women's—Mrs. W. Robinson; Belalie Women's—Mrs. E. J. C. Williams; Boor's Plains—A. H. Watkie, H. Lautabacke, W. Kennett; Borrika—E. H. Cowled, Jack A. H. Fisher, Arthur Schuster, Roland A. Dohnt, D. C. Cunningham, S. L. Huxtable, G. F. Huxtable, F. K. Taylor, A. Y. Knight, Edgar Huxtable, J. H. Gray; Brimpton Lake—Jos. Rodgers, Len. Harris, A. Ashman, R. Rodgers; Brinkley—Howard Male, Martin Humphrey; Buchanan—E. V. Hansen; Bute—Howard R. Commons, David Harris; Butler—Gilbert Woolford, Lloyd Woolford, John Sponheimer, Geo. N. Pedler; Chapman Bore—H. C. Darling, H. G. Smith, H. O. Launer, H. Waters; Charra—A. R. Haseldine, E. T. Mewett, L. Mewett, E. A. Denton, E. J. Schultz, A. H. Brown, D. Brown, V. Brown, A. J. Handtke, R. E. Borlase, E. M. Borlase, E. A. Borlase, A. J. Borlase; Clare Women's—Mrs. S. Lloyd, Miss D. Scott, Mrs. A. C. Jeffrey; Collie—Geo. S. Smith, A. E. Starkey, L. E. Symes, R. L. Starkey, F. Starkey, W. T. Schultz, H. J. Smith; Coomandook—C. P. Wilkin, R. W. Allen, Rex Allen, Hugh Allen; Coonalpyn—G. J. Dixon, J. N. Dixon, G. H. Sutherland, W. E. Pope, E. Burns, R. Spangler, E. A. Rountree; Coonalpyn Women's—Mrs. E. Hanna, Mrs. A. S. Dixon, Miss E. M. Dixon; Coonawarra—H. Munn; Coonawarra Women's—Miss E. Redman; Echunga Women's—Mrs. D. Golding; Gadstone—G. C. Sandow, E. E. Clothier; Gladstone Women's—Miss Jean Harris; Glencoe—K. W. Agnew; Green Patch—H. G. Hender, Roy McDonald, H. Schwerdt; Gumeracha—John G. Lemmey; Hartley—G. L. Harvey; Hilltown—H. C. Dinham; Hope Forest—Ernest Taylor, C. E. Pollard; Hope Forest Women's—Mrs. B. M. Buchanan; Karte—C. G. Roberts, F. Gregory, F. R. Huckel; Keyneton—A. J. F. Kroehn, R. E. Kroehn, K. Munchenberg, L. Munchenberg, P. R. Graetz; Kingston—G. Downing, H. Smith, O. Jarman, L. Jarman, N. J. Hann, T. J. Giles, H. R. Harris; Koolunga Women's—Miss Lylia Fuller, Mrs. S. R. Freeman; Koppio—Ron. Carr, Jas. Schultz, F. Brennand; Kulkawirra—P. Ridge, L. G. Tregilgas, R. A. Dodd, H. T. Altus, A. Cushion; Kybybolite Women's—Miss E. E. Linton; Lameroo—M. O'Grady; Lenswood and Forest Range—A. E. Bridges, J. Schultz; Light's Pass—Rev. R. B. Reuther, D. Woodward; Lipson—C. J. Partington, E. Bratten, E. B. Morris; Lobethal—B. Klau; Lyndoch—W. A. Boehm, A. S. Lawes; McLaren Flat—F. R. Bruce, G. E. Baxendale, R. J. Deane; McLaren Flat Women's—Mrs. Frank Bell; Milang—P. Bagley, W. J. Strachan, J. S. McLean, A. P. McLean, H. Young; Millicent Women's—Mrs. G. Stenner, Mrs. W. Sinclair, Miss D. Towers; Miltalie—Claude

Chase, Wm. Chase, Sydney Story, Colin Story, Noel Ramsey, Jim Jacobs, Clyde Ramsey; Minnipa—Geo. Williams, V. Karger, T. O'Callaghan; Mount Bryan—H. J. Edwards, J. Beaglehole, H. L. Foote, D. Thomas; Mount Gambier—S. Kilsby, S. Norman, W. J. Jenkin, A. A. Hill, Ken. Kuhl, J. C. Dowd, R. H. Robertson, C. B. Mitchell; Mount Pleasant—A. E. Smythe, J. D. Fryar, K. O'Dea; Moorook—F. E. Gibson, Colin Battams, F. A. R. Battams, Hugo Drogemuller, Jas Aird, Jr., Ted H. Aird, Jack H. Snow, Herbert T. Loxton, Arthur Downs, Colin Vercoe, Reginald Knapp; Murray Bridge—W. G. Goyder, S. M. Close; Murraytown—L. P. Nottle, I. R. Curtis; Myponga—C. J. Wickham, A. Eatts, R. Oldfield, S. E. Penhall, J. J. Muller, H. H. Stock, D. D. Nicholls, E. C. Symonds, A. D. Magor, H. Turner, F. Turner, F. Lock; Myponga Women's—Miss O. Magor, Miss N. Magor; Narridy—L. B. Greig, W. G. Johncock, H. Price, C. Price; Narridy Women's—Mrs. H. Price, Miss Ivy King; Nunjikompita—N. Smith; Owen Women's—Miss L. Burtt, Mrs. Roy Wood; Parilla Women's—Mrs. J. Mann, Miss E. Mann, Mrs. J. Woodrow; Parilla Well—H. W. Slater, Sydney Pahl; Parrakie Women's—Miss B. J. Cabot, Mrs. E. Isaacson; Penola Women's—Mrs. W. Balnaves, Miss R. Carman, Mrs. Walter Balnaves, Mrs. J. O'Connor, Miss B. O'Connor, Mrs. E. R. Satchell, Mrs. J. O. Fowler; Pinbong—H. C. Hissey, L. C. Hissey; Pinnaroo Women's—Mrs. F. Bailey, Mrs. R. Tilbrook; Poochera—Alex. B. Bockelberg, Vincent Newbon, Mark Prowett; Ramco—C. Curtis, L. Burton, Gordon Palmer; Rendelsham Women's—Miss Jean Wicks, Miss Heather Smith, Miss Lois Andrews, Miss Maisie Galway, Miss Ada Brahm; Renmark North and Chaffey—A. H. Reudiger, M. R. Cowan, E. J. H. Coombs, Ross Storey, Frank Storey, J. C. V. Martin, G. W. Coombs; Riverton—D. C. Hannaford, E. Travers; Saddleworth Women's—Mrs. D. E. Coleman; Smithville Women's—Mrs. G. Small, Mrs. C. Nairn, Mrs. J. Kelly, Mrs. W. Hammatt, Miss D. McEwin; Snowtown Women's—Miss D. Hancock, Mrs. R. P. Sinclair, Miss M. Work, Miss E. Work; Spalding—H. R. Collins, M. Campbell, M. Allen, A. Adams, K. Trengove, M. Gericke, M. Page, L. Page, A. M. Stephenson, Thos. M. Sullivan; Strathlabyn Women's—Mrs. O. Clifford; Summerfield—Archie Paech, David Law; Tantanoola—E. J. Telfer; Taplan—Peter Hart; Taplan Women's—Miss I. Moule; Tatiara—Hilton Hinge, A. A. Harwood, Rev. A. G. Hay; Truro—D. E. Mickan; Ungarra—J. Davies, W. Roediger; Upper Wakefield—G. A. Simon, S. Simon; Warcowie Women's—Mrs. H. E. Ward; Warramboo—G. Klantc, R. R. Sampson; Warramboo Women's—Miss L. Anderson, Miss M. A. Patterson; Wilkawatt Women's—Mrs. F. G. Bates, Miss M. Clarke, Miss M. Brooker, Miss M. Steer; Williamstown—Jim Parmenter, Len Fromm; Willowie—G. M. White, J. White, D. Reddeway, E. C. Foulis, D. Foulis, O. Tilbrook; Wilmington—I. H. Begg; Wilmington Women's—Mrs. G. Baeker; Wirrabara Women's—Miss B. Woolford, Mrs. H. Hunt, Mrs. R. Banfield; Yandiah—R. C. Hollitt; Yandiah Women's—Mrs. J. E. Keller, Miss E. Borgas, Miss Daphne Borgas, Miss Enid Borgas; Yeelanna—V. S. Modra, L. E. Modra, L. B. Smith, A. J. Molloy; Currency Creek—J. C. Olsen, Garnet P. Holme; Frayville—S. Wachtel, V. Eichler; Greenock—B. T. Habermann; Keyneton—M. E. Munchenberg; Narridy Women's—Miss S. Price; Nelshaby—M. M. B. Middleton; Renmark North and Chaffey—Chas. Moore, J. B. Brocksopp; Robe—F. Domaschenz, R. Dawson, Jnr., A. W. Savage, J. W. Lea, F. Thompson;; Waikerie—R. H. Schomburgk, G. M. Arnold, G. A. Kerr; Wasleys—P. J. Carey; Wirrabara Women's—Mrs. L. Eyles; Yundi—W. R. Hedger, Jnr.

Life Members.—Approval was given to the appointment of the following persons as Life Members:—G. F. Ferguson, J. Dow, F. A. Telfer (Glencoe), W. Turner (Blackwood), R. Schultze (Koppio), N. G. Stewart (Butler), E. G. Humphrey (Brinkley).

Crop Competition Committee.—The Hon. Minister intimated that he approved of the appointment of Hon. A. L. McEwin, M.L.C., as a member of the Committee controlling Crop Competitions.

Resolutions submitted by Congress and other matters were dealt with in committee.

Rainfall Table

The following figures, from data supplied by the Commonwealth Meteorological Department, show the rainfall of the subjoined stations for the month and to the end of October, 1937; also the average precipitation for October, and the average annual rainfall.

Station.	For Oct., 1937.	Av'ge. for Oct.	To end Oct., 1937.	Av'ge. Annual Rainfall.
FAR NORTH AND UPPER NORTH.				
Oodnadatta	0·27	0·47	1·23	4·60
Marree	0·26	0·48	3·14	5·80
Farina	0·28	0·51	6·32	6·37
Copley	0·32	0·48	5·40	7·76
Beltana	0·82	0·53	7·34	8·39
Blinman	1·30	0·76	11·05	11·71
Hookina	1·10	0·61	9·84	10·94
Hawker	0·88	0·81	12·59	12·09
Wilson	0·75	0·90	11·51	11·65
Gordon	0·70	0·80	10·47	10·33
Quorn	0·77	1·14	14·73	13·10
Port Augusta	0·59	0·86	10·26	9·40
Bruce	0·30	0·85	11·93	9·74
Hammond	0·31	0·98	11·27	11·05
Wilmington	0·63	1·49	19·38	17·18
Willowie	0·56	1·01	11·89	12·10
Melrose	0·56	2·02	20·80	22·80
Booleroo Centre	0·74	1·33	14·81	15·14
Port Germein	0·41	1·13	12·05	12·51
Wirrabara	0·88	1·68	21·59	19·22
Appila	0·62	1·33	14·50	14·59
Cradock	0·64	0·88	15·92	10·67
Carrieton	0·51	0·98	11·18	12·11
Johnburg	0·39	0·88	12·51	10·49
Eurelia	0·54	1·01	12·20	12·66
Orroroo	0·50	1·10	13·38	13·12
Nackara	0·62	0·72	19·73	11·09
Black Rock	0·64	1·02	10·95	12·26
Oodlawirra	0·61	0·73	12·46	11·34
Peterborough	0·43	1·13	9·98	13·14
Yongala	0·58	1·26	13·88	14·37
NORTH-EAST.				
Yunta	0·73	0·72	11·59	8·44
Waukaringa	0·37	0·65	9·36	7·82
Mannahill	0·91	0·76	9·84	8·08
Cockburn	0·87	0·64	9·44	7·81
Broken Hill	0·96	0·79	8·38	9·40
LOWER NORTH.				
Port Pirie	0·46	1·23	12·99	13·18
Port Broughton	0·30	1·24	13·85	13·87
Bute	0·65	1·39	14·93	15·42
Laura	0·50	1·71	15·27	17·93
Caltowie	0·68	1·54	20·61	16·69
Jamestown	0·67	1·62	16·66	17·68
Gladstone	0·48	1·57	14·57	16 31
Crystal Brook	0·58	1·52	16·00	15·79
Georgetown	0·59	1·66	14·88	18·24
Narridy	0·53	1·41	16·84	15·74
Red Hill	0·44	1·48	17·16	16·55
Spalding	0·33	1·75	15·34	18·68
Gulnare	0·58	1·69	16·67	18·51
Yacka	0·40	1·34	15·59	15·38
Koolunga	0·40	1·41	13·74	15·29
Snowtown	0·52	1·40	16·07	15·69
LOWER NORTH—*continued.*				
Brinkworth	0·23	1·38	15·97	15·72
Blyth	0·27	1·49	17·13	16·73
Clare	0·48	2·14	24·86	24·43
Mintaro	0·45	2·10	24·52	23·30
Watervale	0·56	2·34	27·28	26·69
Auburn	0·51	2·17	21·46	23·92
Hoyleton	0·40	1·63	17·88	17·25
Balaklava	0·45	1·45	17·15	15·41
Port Wakefield	0·57	1·14	14·82	12·93
Terowie	0·55	1·19	13·51	13·27
Whyte-Yarcowie	0·47	1·18	13·54	13 54
Hallett	0·39	1·48	16·19	16·39
Mount Bryan	0·39	1·39	17·76	16·76
Kooringa	0·41	1·69	18·38	17·78
Farrell's Flat	0·78	1·67	20·48	18·52
WEST OF MURRAY RANGE.				
Manoora	0·44	1·80	18·04	18·91
Saddleworth	0·73	1·78	21·10	19·56
Marrabel	0·67	1·81	20·51	19·91
Riverton	0·51	1·91	20·78	20·79
Tarlee	0·52	1·68	16·55	18·06
Stockport	0·53	1·64	16·50	17·02
Hamley Bridge	0·52	1·53	14·69	16·52
Kapunda	0·99	1·85	15·75	19·74
Freeling	0·56	1·70	12·71	17·79
Greenock	1·00	2·01	15·99	21·47
Truro	0·59	1·84	15·17	19·75
Stockwell	0·39	1·83	15·09	20·02
Nuriootpa	0·51	1·88	17·94	20·74
Angaston	0·42	2·00	18·68	22·33
Tanunda	0·41	1·97	17·99	21·97
Lyndoch	0·42	2·16	18·22	23·28
Williamstown	0·40	2·37	21·56	27·54
ADELAIDE PLAINS				
Owen	0·39	1·62	18·64	14·78
Mallala	0·55	1·52	12·81	16·43
Roseworthy	0·56	1·69	13·45	17·43
Gawler	0·57	1·75	15·33	18·85
Two Wells	0·36	1·41	12·44	15·80
Virginia	0·45	1·49	15·08	17·22
Smithfield	0·58	1·58	17·25	17·68
Salisbury	0·61	1·59	16·99	18·55
Adelaide	0·54	1·74	19·40	21·17
Glen Osmond	0·74	2·15	22·47	25·96
Magill	0·81	2·00	22·65	25·37
MOUNT LOFTY RANGES.				
Teatree Gully	0·74	2·15	23·29	27·03
Stirling West	1·35	3·76	43·00	47·01
Uraidla	0·78	3·36	38·09	43·83
Clarendon	0·73	2·62	26·95	32·81
Happy Valley Res.	0·66	—	21·09	—
Morphett Vale	0·88	1·87	21·68	22·62
Noarlunga	1·14	1·64	21·17	20·35
Willunga	1·07	2·16	21·16	25·96
Aldinga	0·99	1·60	18·13	20·21

RAINFALL—*continued.*

Station.	For Oct., 1937.	Av'ge. for Oct.	To end Oct., 1937.	Av'ge. Annual Rain-fall.
MOUNT LOFTY RANGES—*continued.*				
Myponga	0·80	2·26	26·13	29·72
Inman Valley	1·27	—	24·58	—
Yankalilla	0·79	1·71	19·80	22·78
Mount Compass	1·05	2·92	26·58	36·25
Mount Pleasant	0·77	2·38	21·00	27·08
Birdwood	0·82	2·47	23·73	29·02
Gumeracha	0·82	2·81	28·36	33·28
Millbrook Reservoir	0·82	2·84	32·08	34·50
Lobethal	0·99	2·98	33·47	35·94
Woodside	0·97	2·73	28·28	32·16
Hahndorf	0·86	3·00	27·94	34·82
Nairne	1·26	2·45	21·82	28·14
Mount Barker	1·27	2·75	24·42	31·24
Echunga	1·10	2·85	27·39	33·30
Macclesfield	1·10	2·63	21·18	30·37
Meadows	1·21	3·05	28·57	36·02
Strathalbyn	0·92	1·75	15·52	19·34
MURRAY FLATS AND VALLEY.				
Meningie	0·74	1·49	14·19	18·29
Milang	0·66	1·31	10·60	14·85
Langhorne's Creek	0·94	1·38	11·97	14·93
Wellington	0·59	1·38	12·12	14·66
Tailem Bend	0·57	1·48	12·78	15·07
Murray Bridge	0·78	1·27	8·30	13·49
Callington	0·93	1·35	9·68	15·14
Mannum	0·57	1·04	9·61	11·49
Palmer	0·62	1·47	13·45	15·63
Sedan	0·45	1·14	10·67	12·01
Swan Reach	0·49	0·98	9·10	10·62
Blanchetown	0·40	1·08	8·96	10·95
Eudunda	0·80	1·55	15·86	17·13
Point Pass	0·57	1·55	17·61	16·66
Sutherlands	0·29	0·99	14·27	10·71
Morgan	0·67	0·91	9·46	9·10
Waikerie	1·03	0·94	8·98	9·59
Overland Corner	1·12	0·95	8·48	10·18
Loxton	1·87	1·03	9·38	11·34
Berri	2·16	0·93	10·44	10·03
Renmark	1·88	1·06	10·50	10·33
WEST OF SPENCER'S GULF.				
Eucla	0·52	0·73	6·61	10·08
Nullarbor	0·29	0·61	4·79	8·87
Fowler's Bay	0·32	0·84	7·98	11·93
Penong	0·38	0·87	9·89	12·28
Koonibba	0·62	1·06	10·31	12·18
Denial Bay	0·40	1·02	9·66	11·33
Ceduna	0·53	0·89	7·71	10·32
Smoky Bay	0·57	0·78	8·86	10·50
Wirrulla	0·45	1·03	12·01	10·87
Streaky Bay	0·93	0·98	13·57	14·91
Chandada	0·67	0·98	12·17	12.66
Minnippa	1·02	1·22	11·87	13·97
Kyancutta	1·05	1·47	10·89	13·45
Talia	0·76	0·99	13·55	14·76
Port Elliston	0·72	1·18	15·52	16·53
Look	0·89	1·27	12·91	16·44
Mount Hope	1·00	—	20·52	—
Yeelanna	0·49	1·27	14·47	16·11
Cummins	0·58	1·36	16·56	17·70
Port Lincoln	1·09	1·38	15·89	19·35
Tumby	0·72	1·29	9·64	14·29
Ungarra	1·26	1·51	14·32	16·94
Port Neil	0·64	1·34	8·19	13·16
WEST OF SPENCER'S GULF—*continued.*				
Arno Bay	0·46	1·29	8·68	12·83
Rudall	1·00	1·12	11·02	13·23
Cleve	0·92	1·35	11·32	14·96
Cowell	0·35	1·15	6·64	11·06
Miltalie	0·72	1·34	13·05	13·75
Mangalo	0·90	1·26	9·55	13·86
Darke's Peak	0·95	1·29	14·64	15·24
Kimba	0·72	1·10	9·72	11·84
YORKE PENINSULA.				
Wallaroo	0·59	1·18	12·28	13·97
Kadina	0·40	1·31	14·27	15·59
Moonta	0·24	1·25	11·16	15·04
Paskeville	0·67	1·39	14·49	15·44
Maitland	0·62	1·62	18·02	19·86
Ardrossan	0·48	1·25	14·82	13·96
Port Victoria	0·44	1·31	13·34	15·39
Curramulka	0·48	1·66	14·31	17·81
Minlaton	0·55	1·52	14·16	17·72
Port Vincent	0·57	1·29	10·80	14·37
Brentwood	0·57	1·43	15·79	15·61
Stansbury	0·80	1·48	14·33	16·81
Warooka	0·55	1·38	14·15	17·44
Yorketown	0·54	1·35	13·88	16·88
Edithburgh	0·46	1·32	12·21	16·38
SOUTH AND SOUTH-EAST.				
Cape Borda	1·01	1·58	24·76	24·87
Kingscote	0·72	1·44	16·86	19·27
Penneshaw	1·11	1·52	17·76	19·18
Victor Harbour	0·69	1·82	19·49	21·43
Port Elliot	0·81	1·66	17·71	19·94
Goolwa	0·76	1·48	16·91	17·84
Maggea	0·80	0·98	9·17	10·02
Copeville	0·55	1·14	10·19	11·51
Claypans	0·62	1·13	10·43	10·53
Meribah	1·99	1·03	8·96	11·11
Alawoona	2·14	0·92	9·00	10·26
Caliph	1·28	1·44	11·10	10·44
Mindarie	0·81	1·26	10·55	12·13
Sandalwood	0·83	1·32	11·07	13·60
Karoonda	0·69	1·44	10·47	14·18
Pinnaroo	1·97	1·29	9·85	14·19
Parilla	1·51	1·29	11·04	13·64
Lameroo	1·18	1·52	11·22	15·79
Parrakie	1·02	1·43	11·26	14·61
Geranium	0·69	1·53	11·48	16·39
Peake	0·70	1·55	12·50	15·95
Cooke's Plains	0·57	1·44	13·05	15·29
Coomandook	0·65	1·63	12·40	17·03
Coonalpyn	0·99	1·67	15·84	17·65
Tintinara	1·54	1·72	16·01	18·72
Keith	1·27	1·58	15·79	17·96
Bordertown	1·21	1·78	15·80	19·14
Wolseley	1·15	1·83	15·43	18·47
Frances	1·31	1·96	15·41	20·12
Naracoorte	1·60	2·02	17·99	22·65
Penola	1·87	2·31	19·07	25·94
Lucindale	1·37	1·96	22·43	23·47
Kingston	0·84	1·77	17·02	24·24
Robe	0·73	1·72	23·19	24·65
Beachport	0·93	1·80	22·42	27·07
Millicent	1·29	2·24	25·75	29·87
Kalangadoo	2·14	2·76	22·86	32·05
Mount Gambier	1·10	2·45	17·46	30·34

Feeding Tests at Parafield Poultry Station.

A new series of feeding tests was commenced at Parafield Poultry Station on the 1st April, 1937. Five tests have been arranged each of 50 White Leghorn pullets. The principal object of these tests is to collect some accurate data concerning the results obtained from the soaked grain method of feeding in different ways, also the production of the birds under the various methods of feeding. The following is a list of the tests that have been arranged:—

A. Morning—Soaked wheat at rate of 8lbs. grain per 100 birds, meat meal ½lb. per 100 birds, greenfeed same quantity as dry grain. Afternoon—Same as morning, but meat meal ¼lb. per 100 birds.

B. Morning—Soaked wheat at rate of 8lbs. per 100 birds, ¼lb. meat meal per 100 birds, ¼lb. linseed meal per 100 birds, greenfeed same as No. 1 test. Afternoon—Same as morning, but without the ¼lb. linseed meal.

C. Morning—Soaked wheat once a day at rate of 8lbs. per 100 birds, meat meal ¾lb. per 100 birds. Afternoon—Dry wheat at rate of 1¼ozs. per bird.

D. Morning—Soaked barley twice a day at rate of 8lbs. per 100 birds, greenfeed same quantity as dry grain, meat meal ¼lb. per 100 birds. Afternoon—Greenfeed same quantity as dry grain, meat meal ¼lb. per 100 birds.

E. Morning—Soaked wheat and barley at rate of 4lbs. wheat and 4lbs. barley per 100 birds, greenfeed same bulk as dry grain, meat meal ½lb. per 100 birds, linseed meal ¼lb. per 100 birds. Afternoon—Dry grain at rate of ¾oz. wheat per bird and ¾oz. barley per bird.

The quantity of food as stated in the test will vary from time to time according to the requirements of the birds. The quantities stated in the tests are given as a basis, but are also liable to alteration according to the requirements of the stock.

Test.	No. Eggs Laid from 1st April, 1937, to 30th Sept., 1937.	No. Eggs Laid, October, 1937.	Total Eggs Laid from 1st April, 1937, to 31st Oct., 1937.
A	3,801	833	4,634
B	3,539	888	4,427
C	3,451	847	4,298
D	2,858	917	3,775
E	3,262	827	4,089

	Value of Eggs. 1st April to 30th Sept., 1937.	Value of Eggs. Oct., 1937.	Cost of Food. 1st April to 30th Sept., 1937.	Cost of Food. Oct., 1937.	Return Above Cost of Food for October, 1937.	Total Return Above Cost of Food, 1st April to 31st October, 1937.
	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.
A	19 2 4	3 8 0	6 15 10	1 2 11	2 5 1	14 11 7
B	17 10 11	3 12 6	6 13 8	1 2 8	2 9 10	13 7 1
C	17 5 8	3 9 1	6 15 10	1 2 11	2 6 2	12 16 0
D	13 18 9	3 14 10	6 18 3	1 4 3	2 10 7	9 11 1
E	15 18 5	3 7 6	6 16 5	1 3 5	2 4 1	11 6 1

Meat Exports.

Meat exports (figures taken from statistics supplied by the Australian Meat Board)—

	Total Australian Exports, July-September, 1937.	
	Carcasses.	
Mutton	140,428	(S. Aus., 19)
Lamb	378,871	(S. Aus., 79,280)
Pigs (porkers and baconers)	51,862	(S. Aus., 207)
		Cwts.
Chilled beef	184,346	(S. Aus., nil)
Frozen beef and veal	753,824	(S. Aus., 338)

Agricultural Bureau of South Australia

Reports Received from Branches.

The following is a list of the Branch reports received during the month, and shows the date and principal subject of each meeting:—Allandale East, 24th September, Congress report. Appila Yarrowie, 27th September, Congress report; 22nd October, address, J. A. Lyons, M.P. Balumbah, 29th September, Congress report. Baroota, September, "Pride in the Farm," A. Baker; 16th October, Congress report. Blackheath, 23rd September, Congress report; 21st October, paper from *Journal*. Blackwood, 11th October, address, M. Vickers. Blewitt Springs, 19th October, "Rare Metals," A. O. Bruce. Booleroo Centre, 22nd October, Field Day. Boor's Plains, 7th October, Field Day, address, O. Bowden. Brimpton Lake, 7th October, "The Fruit Garden," A. Henke. Brownlow, 22nd September, "Ploughing after Harvest," A. H. Semmler. Bute, 1st October, Question Box. Butler, 27th September, formal. Charra, 13th October, address, W. H. Brownrigg. Coomandook, 15th October, Field Day. Coonalpyn, 7th October, "Wool Clip," C. A. Goddard; 20th October, "Clydesdale Horses," W. Barrie. Currency Creek, 23rd August, Annual Meeting; 20th September, discussion, "Fencing." Glencoe, 5th October, Congress report. Goode, 20th October, Congress report. Green Patch, 21st October, Field Day. Hartley, 15th October, formal. Hilltown, 5th October, discussion. Inman Valley, 30th September, Field Day. Karte, 14th October, formal. Keyneton, 13th October, "Woolly Aphis," A. T. Dodridge. Kilkerran, 27th September, "Scientific Research and Farming," C. E. Heinrich. Koonunga, 20th October, Congress report. Kyancutta, 5th October, Homestead Meeting, 'Tandem *v.* Abreast Teams," G. M. Grocke. Lenswood and Forest Range, 1st October, papers. Light's Pass, 18th October, "Bookkeeping Methods," Don Farmer. Lobethal, 16th September, "Production of Clean Milk," V. Gurr. Lyndoch, 21st September, Congress report; 19th October, "Crop Rotation," F. E. Waddy. Maltee, 28th September, "Sheep and Wool," P. Schwarz; 21st October, Congress report. Monarto South, 16th October, "Dairy Cattle," V. Lehmann. Mount Barker, 18th October, "Dairying," H. J. Apps. Mount Bryan, 9th October, Congress report. Nantawarra, 20th September, discussion; 20th October, "Better Rotations," S. V. Herbert. Nunjikompita, 14th October, Congress report. Paskeville, 19th October, "Farm Insurance," J. Prouse. Penwortham, 29th September, Congress report. Poochera, 7th October, Congress report. Pygery, 19th October, Field Day. Redhill, 5th October, Congress report. Rosedale, 18th October, address, F. E. Waddy. Snowtown, 24th September, Congress report; 2nd October, "Wool Demonstration," C. A. Goddard. South Kilkerran, 4th October, "Road Sense," O. H. Heinrich. Spalding, 11th October, re-organisation meeting. Springton, 6th October, discussion. Summerfield, 8th October, Congress report. Sutherlands, 7th October, "Fire Control," G. H. Biar. Truro, 18th October, visit to Lobethal. Wallala, 9th October, Congress report. Wandearah, 7th October, Congress report. Willowie, 7th October, Congress report. Williamstown, 24th September, Annual Social; 30th September, Annual Meeting. Wilmington, 4th October, tour of District and Congress reports. Yadnarie, 14th September, "Farm Garden," J. H. Weiss. Yundi, 20th October, Question Box.

Papers Read at Conferences

Sand Drift

[P. R. Hodge, Taplan (Murray Lands East Conference).]

In the past few years the discussion on sand drift has been unfair so far as this district is concerned. Invariably, unsound cultivation methods were blamed, instead of the unprecedented run of dry seasons, accompanied by just as unprecented high winds. In support of this assertion, there are paddocks which have not seen an implement for years, drifting all over roads and fences, in many cases as badly as cultivated paddocks. I had a paddock which I had intended fallowing, but owing to the dry season, withheld the fallowing of it. The result was a drifting mass before the end of the year, which made the adjoining road impassable to traffic. In a normal season, or with normal seasons preceding it, this land could have been fallowed as originally intended, and still not drifted to anything like the same extent that it did. Caution and care are necessary to prevent drift becoming a worse menace. The fact, however, remains that one of the worst seasons so far as drift was concerned, was 1928-29, and the following year crops almost as good as the present season were grown around the district.

Wider Rotation.

As a means of minimising the danger of excessive drift taking place, the writer advises longer rotations in the cropping paddocks; first, the sowing of patches likely to drift after fallowing with rye or other cereals (but preferably rye on account of its quick growing and hardiness against drift), and leaving the tops and part of south sides of sandhills unfallowed until after harvest. The ploughing in, when fallowing, of as much straw and rubbish as possible will help, but this has its drawbacks some seasons when one may not get sufficient rain to rot the straw, &c., enough to allow of proper subsequent workings of the fallow.

With regard to crop rotation, the following is suggested:—Fallow, wheat, oats drilled in through stubble for pasture. This means 1 wheat crop every 4 years, but against this the extra number of sheep it will be possible to carry, will make up for more than the loss of the wheat crop for the one year. In the first place, under ordinary conditions a better crop of wheat will be grown, and in a normal season, if half the oat crop is fenced off with a temporary fence, enough oats and hay will come off the balance of the paddock to feed the farm stock for the season or more. If the season is not too good for feed, it may be necessary to utilise the whole area for grazing. This season I drilled 220 acres with oats in this manner, and although I have not had any stock on the one half so far, the portion which is being utilised for grazing should, to all appearances, with pickings on the fallow and sown sand drifts, keep all the stock going until hay time. The portion of the paddock ungrazed is at present carrying a first-class crop of oats for reaping or cutting for hay.

As a change from the usual rotation, one could go still further and graze the oat stubble the following year instead of fallowing it, and in a normal season good stubble feed should be provided. These methods will help to solve the drift problem, for this rotation will tend to keep the land covered for a longer period than if sown as often as we used to sow, and more stock will be carried on the same area with less labour for cropping periods.

In looking back over 25 years of farming (or for a good proportion of the time trying to farm) in the Mallee, one is reminded of the many changes which have taken place. Scrub land has been turned into wheat fields, fallow paddocks and drifting masses. Bush tracks have been replaced by fair to reasonably good mallee roads; farming methods have changed likewise, and in most instances, must change still further.

In what we are beginning to look on as the pioneering days of the district, a farm or holding was considered to be quite well equipped if it could boast a plant consisting of a scrub roller and scrub rake, disc cultivator (Tickler type), 13 disc drill, mower, 5ft. stripper, hand winnower and 5 or 6 cart horses, mostly of the milk-cart type. Binders were few and far between, and when used, generally required 2 men to work on account of the stumps and rough nature of the cleared land. Shoot-cutting took the place of the present time fallowing season, and it was generally a race with ruin for the crops against the shoots. The method used for cropping often consisted of driving 4 horses in the afore-mentioned Tickler cultivator over the land to be sown, which had in most cases quite recently been shorn of its coat of green scrub which it had carried for many years. This was followed by the disc drill because no other type of machine could go through the sticks, &c., lying on top of the ground. This resulted in scattering to the four winds quite a lot of the seed and super which was intended in all good faith to be sown underground.

Seeding completed, the next procedure was usually to study the clouds or rain prospects at every opportunity, while clearing more land to be dealt with in the same manner next season, in the hope that sufficient rain might be forthcoming to grow enough crop to allow some sort of stubble fire to burn sticks and shoots. This same land was in many cases cropped continually with wheat for 5 or 6 years, and in some cases even longer, and expected to grow crops. Fallowing was a secondary consideration for some years, and ploughs and tine cultivators were not used to any extent until some years later.

The Disastrous Years.

Then to move on to the disastrous period, starting with 1927. Fallowing was by then becoming more general, but we still expected a fallowed paddock to grow 3 or 4 crops before giving it a spell. As a consequence, the land was becoming worked out, so to speak, and almost denuded of any vegetation or root matter in the soil to hold it, thus adding to the shocking amount of drift which occurred in the next 2 or 3 years. In spite of this, however, in the year 1930-31, quite a good harvest was reaped, and some excellent hay cuts were secured in answer to many who tried to tell us that the country would never stop drifting, or be suitable again for wheat-growing. It is answered again this season, and always will be according more or less to the season's rainfall. We can help Nature, but cannot order our requirements in this respect.

The majority of Mallee farmers have come to the conclusion that this country needs working and spelling, in the same manner that other farm lands of this State do, or at least in a very different manner from which it has in the past.

Fodder Conservation.

There are still many lessons to be learnt by many Mallee farmers, and one of the most glaring is the lack of fodder conservation. Good seasons are with us at present; last season was quite a good one for cutting hay or other cereals, and this season better still, and yet we still see many farms with little, if any, surplus hay or other feed put aside. Bad seasons will come again, and it is far easier to face them with plenty of stock feed than to pay £5 or £6 and more per ton for chaff, as has been done in the past.

In the drought of 1914 £50 would only buy 5 tons of chaff, and yet the same quantity could have been cut last season with wheat at a very fair price for considerably less than half that amount. In the case of oats for hay, the cost would probably be no more than one-third. A spare stack of hay not only saves many pounds in buying later, but hundreds of pounds' worth of valuable stock may also be saved. The idea that we will get feed again next year and so there is no need to reserve more this year than for present requirements, is a policy too unsafe for any dry area farmer to consider. Losses of many stock in this district could be traced to the lack of plenty of feed at the urgent period, as horses are often turned out into paddocks through shortage of stable feed when the grass is far too short to allow of their getting a bite without a big percentage of paddock as well as grass.

Most of us have improved cultivation methods in the past few years, and why not follow it up with improvements in other directions, and start off with the principal one, the conservation of fodder? If we get too much, we can, in the next drought, reverse the position and sell to the less fortunate at similar prices to which we ourselves have paid in the past.

Cause and Cure of Paralysis in Poultry.

In the course of a reply to this question, which was submitted at the Taplan Conference, Mr. C. F. Anderson (Chief Poultry Adviser) says paralysis in adult poultry is a comparatively recent trouble. Sometimes it results in a complete loss of the use of one or both legs; in other cases it takes the form of the loss of the use of the wings. The trouble is most frequently experienced at from 3 to 6 months. The paralysis has been diagnosed by a number of workers as nerve trouble, and when in this form, it is doubtful whether any treatment will be effective. From cases seen in this State I am of the opinion that there are causes other than a nerve condition.

Where stock have been reared intensively for a number of years, or in a type of house where little sunshine can reach the birds, the trouble is often seen. The continual breeding from pullets and immature stock will produce paralysis. The lack of greenfeed is also a contributing factor.

If pullets do not perch, but sleep every night on a cold floor, it will result in paralysis. Keeping chickens in battery brooders too long will also cause the complaint; 4 weeks is the maximum time they should be kept in batteries.

A cure is very difficult. However, breeding only from 2-year old hens with well-matured male birds, plenty of free range during the growing period and regular and plentiful supplies of greenfeed, will go a long way towards preventing paralysis.

Farming our Light Sandy Soils

[A. A. Jericho, Balumbah (Cowell Conference).]

The drifting of sandy soil is still a problem to be solved, and it is our duty as farmers of to-day to check the drift of sand, or the generation of tomorrow may find it impossible to do so. Too many farmers still hold that erroneous idea "A little drift does good." This is definitely wrong. Sometimes a wheat crop growing on fallow which drifted a little yields very satisfactorily; but this is the result of clean fallow and a crop free from weeds. However, the subsequent crops and feed grown on this land are decidedly less than if the fallow had not been allowed to drift. Further it is a very dangerous practice to pursue, because we cannot control the winds and should they be abnormal we may find our soil in the adjoining paddock or on the road, with only hard clay in which to plant the wheat.

In 1920 I went to Lameroo to gain first-hand knowledge of the practice adopted by the farmers in those districts in dealing with the drift problem; but I found the majority of them were of the above-mentioned type. However, to-day they have learned their lesson, and in some instances drift has got beyond control. In the last 10 or 12 years a lot of our light sandy country has been taken up and worked in earnest. Here I am referring to North-Eastern Eyre's Peninsula in particular. Up to that time this class of soil was considered too poor; but it has now proved itself to be a profitable investment, capable of producing average payable crops and good feed. However, during these 10 years we have experienced frosts, droughts, and a depression of a very severe nature. Consequently the opening up of holdings has ben retarded, and in a great many instances would-be prosperous farmers have failed and have had to abandon their holdings. This has been a blessing in disguise for the district because it has almost in every instance allowed existing farmers to increase their holdings to something like 2,000 acres of arable land, and in the lighter country this should be the minimum acreage for one farm. With 2,000 acres at his disposal a farmer can fallow 400 acres annually, and by putting down pastures and top-dressing, more attention can be paid to grazing. Thus by only breaking up the land every 5 years and allowing more roughage to accumulate in the soil there need be no fear of drift. Windbreaks should be left and sand rises should not be worked with the other land. Every farmer strives for square paddocks, but these should not be obtained at the expense of encouraging drift. A disc plough and spring-tyne cultivator will cause drift, whereas a share plough and rigid tyne cultivator will prevent it to a certain extent. A very disastrous practice is to burn the roughage off the land just prior to fallowing. In the early stages of opening up mallee land the fire is essential to kill shoots and prevent Take-all; but in subsequent years this should not be necessary, and rather than run the risk of the fallow drifting after a burn, a cover crop should be sown on the land.

Breeding Merino Sheep

[R. P. Smith, Miltalie (Cowell Conference).]

Two things are very important, that is, breeding and feeding. Keep the very best sheep, feed them well, never overstock, and the sheep will show a handsome return for labour. Watch the successful men in the district on the same class of land and climate, and see what type of sheep (strong or medium-wool sheep) does the best. Once decided on this, try and buy a good line of station-bred cast-for-age ewes of that type, or as near as possible. Remember that young ewes on the market are usually culls. Old ewes will not cut very big fleeces while rearing lambs, but they are the best mothers and will rear good lambs if there is any feed about.

Select a stud breeder who is breeding the type of sheep you want and stick to him. Do not change about. If you do you will never have type in your flock. A big plain-body strong-woolled sheep will be found suitable for most districts.

Constitution Important.

Constitution is the most important point to watch in sheep breeding. If a flock has not a good constitution they will die the first time feed is short. With a good constitution one can always build on to it; poor constitution means failure sooner or later. The point to watch for a good constitution are:—A big frame with plenty of bone to carry it; wide between the eyes; a good strong broad nose; massive shoulders; deep and wide chest (which gives plenty of lung room); legs set well apart; ribs well sprung (cask-like). In rams look for heavy horns and wide teeth, but not too long. Both ewes and rams should have nice clean, soft, open faces, free from harshness, with the eye-lids, nose, lips, and tongue free from black spots. Sheep showing much black about these points are liable to throw black or partly black lambs. The ears should be short, thick and fleshy, and covered with a soft velvety covering. The neck should be in as straight a line as possible with the back. This gives a sheep a good top line. A dent in front of withers denotes weak constitution, while a hollow behind the withers gives a hollow-back sheep. Hollow backs transmit in breeding and therefore must be avoided. The head is a good indicator of what a ram is; if too free of wool, the progeny will probably be light underneath. The markings (crimp) in horns should correspond with the wool—strong wool, big crimp in horn, medium wool, medium marking. If the markings do not correspond with the wool the ram is of mixed type, and cannot transmit an even type because he has no type himself. Watch around the base of horns. If there is too much roughness there leave him well alone. Mate like with like, and you have a better chance of getting like. The sire can always show a little more robustness than the ewe. The longer one follows one blood the more even the flock will become. This leads to type. The more type one can get in the flock the easier it will be at wool classing time. Fertility is also very important. No farmer can afford to have a poor percentage of lambs. To increase the fertility of the sheep, buy a ram that is a twin. He will not always leave twins, but his ewes will produce a number of twins. Remember that a sire is supposed to transmit his dam's qualities to his female progeny.

Wool.

If you decide to go for a strong wool, see that you get wool and not hair. Strong wool is the most difficult to grow. Keep to that true Merino type with a pronounced crimp. It must be soft to handle, of good length, fairly bright but not china-white, with only sufficient grease to nicely nourish it. Too much grease in wool is very objectionable, is the forerunner of a bad constitution, and will give trouble with blow-fly; grease and wrinkles encourage the blow-fly. Farmers should not try to put too much wool on their sheep. At the same time, some farmers could grow a lot more wool on their sheep. Remember that we keep sheep as a business and not a hobby, so we must consider the return per sheep. Many years ago the sheep in Australia were cutting about 5lbs. wool. In those days they had the plain, very plain-body sheep. They then introduced the wrinkly sheep and increased the wool weights nearly 100 per cent. One cannot grow a tight fleece on a tight skin under ordinary grazing conditions. Watch for substance, evenness, crimp, colour, and yield.

The Forge on the Farm

[F. G. Gardner, Koppio (Ungarra Conference).]

The forge is a very important part of the farm equipment and is sometimes seen in the open on new holdings, even before any other buildings are erected. When purchasing a forge do not stop at the forge or blower alone, but have an anvil, vice, few pairs of tongs and, (if funds will permit) a set of taps and dies, as then a thread can be put on a bolt or nut if required.

The forge should be put in a blacksmith shop out of the weather and a bench made for tools, with a good post for the vice on the end of the bench. As funds are available, additional tools can be added to the stock in the shop. Money spent on good tools is money spent wisely; and one cannot have too many good tools; inferior ones do not last as long and often cause bruises and loss of skin. After getting a start with a few tools. others can very often be made as required when one becomes proficient.

The blacksmith shop is quite a good place to put in the time on a wet day. Then repairs can be made to breakages that have occurred previously. The best method for beginners at the forge is to practise making hooks for the swings and split links. These require no welding, and after a time welding links can be practised; when these can be done straight-out welding can be tried.

The forge is invaluable for other things besides welding. Very often when the land begins to set hard at ploughing time, ploughshares can be sharpened and made to do better work. When fencing on the farm the crowbar often becomes thick and this can be improved with the aid of the forge; also other tools can be sharpened. Harrows occasionally want repointing, which can be done on a wet day in the shop. In the harvest time the horses on the farm require to be shod. This is another job for the forge, as the shoes have to be heated to be clipped and punched as well as fitted.

If a drilling machine is fitted to the shop, repairs to castings can often be made by drilling and riveting a plate on them. In some instances they can be brazed, if a tin of flux and some soft brass is kept on hand. Farm equipment is not complete without the blacksmith shop and the forge.

Better Sheep and more Wool per Sheep

[M. T. **Gardner**, Koppio (Ungarra Conference).]

This is a subect that should interest every wool grower, as the more wool grown per sheep the greater the profit of that calling.

In the production of wool one may have certain ideals of what is the best wool, but in growing it the keeping up of one's ideals may be a losing proposition financially.

One may often hear the remark, "What pretty fine wool" and it may be so, but the pretty fine wool is not always the most profitable to the grower. Wool production may be increased in several ways:—More feed, better, more costly sires, culling out of poor producing types, and lesser numbers but better animals. Whilst any of these methods may accomplish much, it is in the combination of all of them that the best results will be obtained. If a farmer or grazier reckons on his holding carrying a certain number of sheep, it is up to him to see that each sheep is doing its best both in size, standard of quality and quantity in production of wool. In a team of horses each animal is expected to pull its weight and do its bit. The same should be expected of each sheep toward filling the bale with good quality wool.

In determining how many sheep a holding should carry, the question of how much feed is available is a very important consideration and has the most bearing on the question of increased wool production. No amount of breeding, selection or care can overcome the greatest setback to this objective—under nourishment. Plenty of good water too is necessary. A certain amount (and the more the better) of pasture, topdressed in the Autumn, (not less than 90lbs. 45 per cent. super per acre) will help to provide the necessary feed, and if seasonable conditions were unfavourable in the previous Spring, some supplementary ration of chaff or oats will have to be given until green feed is sufficient to sustain them. This may not be necessary if a quarter of the holding is topdressed annually and dry feed is conserved. To keep one's sheep well I should not recommend more than three sheep to four acres on the average grazing properties of the lower end of the Peninsula. However, this depends on how much sown cereal crop is available for pasture, and how much hand feeding is practised.

Having then decided to provide plenty of feed, the question of mating has to be considered, as breeding is necessary to maintain a high standard in a flock of sheep. Large plain-bodied, good length, high quality, strong-wool (58 count) sires should be selected, and joined with good framed ewes selected for evenness of type, with plenty of character in the wool, plain-bodied, with nice neck fold development and lengthy staple of wool, with a view to establishing and maintaining a typy flock of sheep of about 60 to super 60 count of wool. Suitable types of sires are grown in the Burra district or bred from types of Burra district stock, which seems an ideal locality for the development of the typical strong-wooled merino. To state a particular type, I would recommend Koonoona-bred sires for this, and South of this locality. I have seen these sheep tried out locally, and a remarkably good type of large framed, heavy wool-producing and commercially profitable sheep is the result of 20 years' breeding from Koonoona sires. However, selection of type is a matter of individual taste for flock maintenance purposes.

Having got a start to breed better sheep, it is the most difficult job of all to keep on improving them, and it is with this objective that culling has to be practised most judiciously. So many defects can creep in, and have to be guarded against; uneven quality wool, saddle backs, wrinkly tails and excessive body wrinkles, short wool, thin wool, straight wool, cow hocked and defects of conformation in shape to general types as size, body, &c. A ewe may conform to the type of sheep aimed at, but if the wool is not good enough in quality out she goes. In culling out, size and quality should be the first consideration, and anything not up to the standard of quality should be passed out.

A good demonstration of commercial wool was seen at the Adelaide Show this year (First Prize Rams). The pretty and fine wool scored the highest monetary value per lb. but it would not be a profitable type of wool to grow where the bigger, more bulky fleece could be grown. For years past I have been an advocate of the finer type of wool but I have realised that I have been left behind in value per sheep by keeping to that standard of quality, and it has been reflected in the size of the sheep also; and I am now endeavouring to grow stronger wool, bigger sheep and bigger and more bulky fleeces. Different localities have different types of sheep and wool, and it is possible to blend the poorer with the better by using better sires and on most of the agricultural land to raise the standard of quality and increase production.

Assuming that the production of wool has increased and that the type of sheep has been improved, a few remarks on the conveniences for working the sheep and handling the wool should not be out of place. Good fences, plenty of water, good gates and a fairly convenient set of sheep-proof yards are a great help in handling sheep, and surely good sheep are worth some time and money in the erection of necessary conveniences for handling them.

Shearing contractors with own plant provide a cheap and handy means of getting the clip off, and if one has not a good shed it is a profitable proposition to have them shorn at a neighbour's where good facilities for shearing are available.

Crutching is a very important item and profitable too. I believe in having all sheep, both sexes, all ages, crutched with machine twice yearly, at the end of April and second week in August. This year I had all mine done twice, 500 each time. The cost of crutching was £5; and the wool realised £9; profit £4. There are no flies around the sheep, no trouble, no chasing sheep in every few days and cleaning them up, no worry, no loss of sheep, no loss of wool.

Wheat and Barley Production

[R. R. Wilson, Yeelanna (Ungarra Conference).]

Wheat and barley are our two main crops of grain for export and local requirements, and now that high prices are prevailing, more attention should be given to increasing production per acre, as well as endeavouring to improve the quality of our grain.

WHEAT.

Fallowing.—While we grow high yielding crops of wheat from grassland in the Yeelanna district and other districts of Lower Eyre Peninsula, attempts at growing wheat from grassland should not become a general practice in farming where clay subsoil is not present; also where heavy clover growths and same climatic conditions as we have here are absent. If early rains do not fall, good results are seldom obtained from grassland crops, and much extra power and plant is required to do the work in the short period before sowing the crop. Fallow is often abused, allowed to become weedy and not properly cultivated. In such cases it is better not to fallow at all. Early fallow, July and early August, is usually the best, preferably early July, as you receive the benefit from the winter rains and conserve extra moisture. Nitrification proceeds rapidly during fallowing, and so nitrogen is made available. The land should be cultivated from time to time until free from weeds and the soil consolidated to about 2½in. from the surface. From this time until sowing, a crust should never be allowed to form on the surface. The moisture will escape very rapidly through a hard surface; also the work of soil bacteria is retarded, and when a rain falls the soil does not receive the moisture it would with a loose surface. Light implements are best when the fallow is at this stage, and the work should be done quickly. Such implements as spring harrows, with spring pressure and shares on two rows of the points, or shares attached to ordinary harrows and weighted, are good. With a 12-leaf set 150 acres can be done in a day. It is unwise to work the soil when it is too dry or to work heavy clay when too wet. Do not work the land only when convenient to you, but work it when it needs it.

Selection of Seed.—Select varieties true to type, avoid mixed weeds, and avoid grain which was not not thoroughly ripe when harvested. The grain should be plump and free from foreign matter. The variety must be governed by the class of soil and climatic conditions. The low rainfall districts do better with a variety carrying little flag, whereas the higher rainfall districts will carry a variety with plenty of flag, such as is always found in late varieties of wheat. Where heavy growths of weeds are anticipated, in this district, sow a quick growing variety, and sow later, say June, using 75 to 80lbs. of seed per acre.

Superphosphate.—The saying that superphosphate is "The life-blood of Agriculture" is a true one. For many years past farmers have realised the absolute necessity for heavy dressings of superphosphate for best results. We must build up our soil fertility. That is the greatest need of Agriculture, besides reducing the cost of production by growing more per acre. As sure as the sun rises, your land will grow less productive unless you hand back some of the fertility you extract from it. Superphosphate is plant food, and it greatly assists in restoring the elements of fertility which have been exhausted by previous crops. Our soils are deficient in phosphoric acid, and the production of heavy crops of grain cannot be continued for very long without liberal dressings of superphosphate. I recommend from 1¼ to 2cwts. for wheat crops, and if the land is left for grazing, a heavy growth of clover will follow. Especially is this quantity of super necessary on soil over a 15in. rainfall. Some farmers argue that heavy dressings of super lead to blighting of the crop. This not so, but is due to special weather conditions, principally to north winds drying the leaves of the plant more quickly than the roots can make moisture available.

Rotation of Crops.—Rotation of crops, of course, is necessary. Often good fallow is prepared, well sown, a liberal dressing of superphosphate applied, but the yield is disappointing, if the land has not received a crop of oats or English Barley since the last crop of wheat was grown. Sometimes good crops of wheat are harvested from a wheat-fallow-wheat rotation, but it is not a good policy. I prefer a fallow-wheat-barley or oats-pasture-fallow-wheat rotation. With the latter rotation, Take-all, flag smut and other diseases are more easily avoided. More sheep can be kept and soil fertility is maintained.

The Seedbed.—By having a firm, compact, solid seedbed near the surface, and placing the seed on the hard bed, a perfect germination takes place. The roots immediately force their way into solid soil, and a healthy crop results, and one that is in a better condition to withstand a dry Spring. When heavy rain does not fall prior to sowing, run over the land with a culti-packer or roller. This operation is most necessary on loose soil. By sowing wheat on loose soil the roots of the plant form themselves into a ball and having no roots down into the hard soil the plants wither with the first hot, windy days. The reason why grassland does so well is because use of the culti-packer for growing wheat enables the lumps of hard soil to be broken up, and large air spaces are practically gone after a culti-packer has been used.

Much more can be said about wheat production—far more than I have time to write. Wonderful progress has been made during the last 20 years and still there are many secrets in agriculture not discovered. However, if the following important factors are observed, good yielding crops will usually result:—(1) Good cultivation; (2) The best available seed; (3) Liberal dressing of superphosphate; (4) proper rotation.

BARLEY.

The amount of wealth made available to farmers in the suitable Barley growing districts in our State is enormous, and lower Eyre Peninsula can well hold its place amongst other parts in quality as well as yield.

I have grown barley on Yorke Peninsula and Eyre's Peninsula for the last 30 years and cannot recollect any season when it has not been a more payable crop than wheat. Prices always appear to rise and fall in sympathy with wheat. Barley is a cheap crop to grow and also serves as a good rotation to a wheat crop. Like a wheat crop, good seed is necessary; avoid seed which has been badly skinned. Careful grading and pickling with a mercurial pickle is advisable. Mercurial pickle has proved it will control smut, and it assists in control of Stripe disease, now becoming prevalent in our barley crops. Admittedly this pickle is more costly than formalin, but much of the extra cost is offset by not having to wet pickle when the busy seeding operations are in progress.

Of recent years I find a heavier dressing of super in our particular ironstone soil is the means of producing better samples of barley. Farmers on Yorke Peninsula usually dress with 50 to 90lbs. per acre, but in this district 112lbs. or more is giving good results. The land for barley crops does not require many cultivations prior to sowing, but the operation needs to be a thorough one, preferably using a heavy draught cultivator or skim plough. One good working by one of these implements, harrowed, sown with a combine after a wheat stubble burn, appears to be ample. Harrowing immediately after the burn will save all the ashes from the stubble and provide potash for the soil. It is a good scheme to have the harrows waiting to run over the land immediately the fire finishes burning the stubble. Stubble land nearly always yields the best quality barley. Quality must be considered before quantity; therefore wheat stubble land is more suitable than grassland. Barley should never be sown on fallow, because of excess nitrogen, resulting in rank growth and stained grain.

Barley should not be harvested until thoroughly ripe, or the grain becomes flinty and of a very dark-grey colour. Skinning of barley during harvesting often ruins a first grade sample. Of recent years this has been controlled to much less injury, due to farmers being educated to proper setting of the machine and to the assistance of machinery manufacturers.

Papers Read at Branch Meetings

Road Sense.

[O. H. Heinrich (South Kilkerran).]

Any one, whether motorist, cyclist, teamster, stockman, or pedestrian, should cultivate road courtesy. As the majority of us use the roads under all of the above headings at some time or other, it should not be difficult to treat others as we would have others treat us. The first essential before going on to any public road is to see that whatever you are going to take on to the road is roadworthy, that is, it must be safe for yourself, safe for other people and not a menace, and last but not least, it must not damage the road itself. Motorists should see that their steering gear and brakes are safe and efficient, tyres safe, vision not obscured, and at night time that their lights are effective and do not glare.

If driving a horse, see that it is not a menace to other road users. A teamster should not use a vehicle that is liable to break down with a load and so obstruct the right of way. The same may apply to drivers of motor trucks and trailers.

Should a breakdown occur, lights should be placed around the obstruction before nightfall, and if on a bend some warning should be given to approaching traffic by some person, until a suitable sign, such as a red flag, is obtained. I may mention here that I trust the time is not far distant when yellow becomes the recognised danger colour.

A person should never attempt to use a road when physically unfit or unable to exercise control of vehicle, team, or even himself. Special mention may also be made to drinking. It is a good thing to bear in mind the saying, "You cannot drink and drive." Your attitude to men working on the road should at all times be courteous and respectful. These men are earning an honest living and are doing necessary work, and their safety concerns them, their employers, and their dependants just as much as your safety concerns you and your dependants. Wherever men are working on the roads always slow down and pass with caution. You never can tell when one of them is about to cross and is not aware of your approach.

Respect councils' and local governing bodies' plants and tools as you would your own. Always obey the rules of the road, although you may appear to be alone in the world. Accidents always happen when you least expect them. To obey the rules one must know what they are. One rule that is persistently, negligently, or ignorantly disobeyed is "Keep to the Left." It is most annoying when one meets or catches up to some driver dawdling along on the wrong side or right in the middle of the track and then he will not move to let one pass. It is also most dangerous, when driving in hills or around bends where the vision is obscured, to do anything but hug the left side of the roadway. When approaching mobs of sheep, horses, or cattle, always slow right down and give the person in attendance a reasonable amount of time to clear a way. Don't go through the middle. If you injure an animal you will be delayed much longer than the time required to pass correctly and will probably be considerably embarrased. When meeting heavy loads it is an unwritten law to allow the loaded vehicle to retain the best part of the road. When minding or travelling stock always be on the look out for approaching traffic and attempt to clear a way as quickly as possible.

The life of a new piece of road depends to a very large extent on the people using it in the early part of its history. On newly formed roads drive near the crown when it is wet and down near the shoulder when dry. But it is also necessary to drive all over it so as to get it set; do not follow in the same old tracks all the time. Metal roads almost anywhere show evidence of bad driving when they were first made. You will find two deep tracks; with the middle and both edges high. Consequently the water runs down the two tracks and washes out all the binding, making it rougher and deeper still, or else it lies there, and where you get water and traffic there is bound to be trouble with roads. Common sense and a little forethought on the part of the road users could save ratepayers many thousands of pounds.

Special care is required when shifting tractors and implements from place to place. Some people have the deplorable habit of shifting to some distant paddock almost every time it rains, with no regard whatever for the mess they make of the road, and still less regard for their neighbour's water runs. These same people have no hesitation of putting the most objectionable stops across the road to catch the water for themselves. Use a little forethought, plenty of common sense, and the utmost caution when using public roads.

Management of Dairy Farm.

[J. Mellors (Rosedale).]

Stock and Management.

The farmer who carries on dairying to a limited extent cannot devote the necessary attention to his cows, because he is called to the more important duties of the farm, and therefore he usually leaves his cows in charge of the wife and family, or perhaps he employs a man to attend to them.

The dairy farmer who is dependent on his herd naturally devotes all his attention to the cows. He in truth is a specialist and therefore must specialise in proper breeding, feeding, and management, and these must be enforced if he wishes to be successful. Firstly, he must choose the type of cow, mainly to suit the district, whether it be near a butter or cheese factory or a milk depot.

The Ayrshire and Holstein Friesian cattle are mainly suitable for the dairy farmer who is situated near a cheese factory. This is being carried on extensively in the Lower South-East of South Australia, although there are quite a number of such cattle along the Murray Swamps. The milk is delivered to the city, suburbs, in most cases it is pasteurised and used for household consumption.

The Shorthorn is more of a beef cow and requires heavy feeding, yet there are quite a number of dairymen who insist on keeping them. A number of farmers nowadays are crossing the Shorthorn mainly with the Jersey, thereby producing a very hardy type of cow suitable for the farm. It can be mentioned that a ready sale can easily be found with the calves of such cows, as the calves make excellent vealers.

The Jersey is most suitable to the man who supplies his cream to the butter factory. The Jersey is an allround dairy cow; she is hardy, and requires less feed than most other breeds. The Jersey is becoming more popular with the dairyman who retails his milk, ensuring the consumer good quality milk, especially in these days of much competition.

Whatever the breed a dairy farmer specialises in, he must take care of the sire, infinitely more so if the bull is well bred; for it must be remembered that the bull is 50 per cent. of the herd, therefore he must feed and care for the sire just as he would his best dairy cow. Having selected the herd and breed one must take the necessary precautions to see that they are kept healthy and well fed. During the cold winter nights it is absolutely necessary to see that the cows are kept warm and dry. Therefore, it is a good plan to erect a large straw shed, capable of housing all the herd.

Another boon to the dairy farmer is the de-horning of his herd, a practice which should be enforced. It will be noticed that a number of cows have a tendency to knock the others about, especially when brought into the milking shed, and the usual result is that the weaker cows are lacerated and bruised. To overcome this menace we have de-horned our herd, including the sire. The cows have been considerably quietened and are less troublesome to each, and also to the fences. Once again tranquility reigns in the cow yard.

The sheds must be laid out with concrete or cement floors, and drains, with a catchpit at end of same. These being the Regulations set down by the Central Board of Health, we must comply with the Regulations to assure the consumers that the milk is being produced under hygienic conditions. Cleanliness is essential throughout the dairy. Milk cans, buckets, &c., must be kept in a flyproof room, with a cement floor and drain; also articles must be thoroughly sterilised with boiling water after use. Another good point to be enforced is the necessity of keeping various veterinary appliances handy for when certain cows happen to be ailing. Sore teats, cuts, and other minor wounds are common occurrences, therefore, clean bandaging, ointments, such as petroleum jelly, &c., should be on hand. Milk fever is a complaint to be watched, especially among a herd of heavy milkers. A bicycle pump and valve thoroughly sterilized should be kept for use in this complaint. A dairy farmer cannot be too careful, therefore he must keep such appliances in case of emergency.

Ailing cows, even those due to calve, should be immediately isolated. If a cow is kept from the rest of the herd there is no danger of her being molested. Epsom salts is a good safeguard against milk fever, more so if given to the cow in drench form, 2 or 3 days before she is due to calve.

A dairy farmer desiring to keep the calf from a well bred cow should allow it to run with the mother for 3 or 4 days to enable it to get the first milk. It can be placed in a dry shed and fed on fresh milk for 2 or 3 weeks. After this period a little separator milk can be added, at the same time not decreasing the amount of fresh milk. As time advances, the amount of separator milk can be increased, and the quantity of fresh milk decreased. Then the calf can be turned into a small paddock and learn to pick the grass. One complaint prevalent among young calves is the "Scours," which is usually caused by calves drinking from dirty vessels. It can be remedied in the early stages by dissolving a small handful of salt in the milk, until the complaint disappears.

FEEDING.

A dairyman who is dependent on obtaining a large supply of milk from his cows must feed them well and regularly. Scientific feeding, such as a balanced ration, will prove profitable to any farmer or dairyman. When the first rains come in April or May sow cereal crops for feed. Oats and Barley are advocated by most dairymen. These crops are excellent for grazing purposes. In growing these cereal crops a fairly heavy dressing of superphosphate is necessary to obtain a prolific growth.

A dairy farmer with only a small holding of, say for instance, 100 acres must take care of his pastures. If, for example, he has sown a 30 or 40 acre paddock for feed, a good plan would be for him to subdivide his paddock into 3 or 4 smaller blocks. This can be easily accomplished with the aid of a few posts, light droppers, and a coil or two of barbed wire. By this method he can graze his pasture in rotation form, giving his milkers the succulent fodder and allowing his dry stock and heifers to follow and clear off the rubbish.

As the spring time comes near it is a wise plan to let one or two small blocks grow, and later these can be made into ensilage. With the abundance of feed at this period of the year the dairy farmer should provide for the summer and also for lean years.

Conservation of fodder in the form of hay and ensilage will always reward the dairy farmer who thinks of the future. Ensilage is preferred by the cows to hay, the former always keeping the cows in a healthy condition. Ensilage is not subject to ravages of fire, water, and mice, therefore the dairy farmer will not lose if he conserves this type of fodder. When the summer comes it is absolutely necessary to hand feed. Only the best oaten chaff should be used, and fed in conjunction with bran and crushed oats. This is the period when ensilage or lucerne is most needed. The dairyman who is dependent on his herd, and feeds his cows accordingly. will be successful, because careful attention and feeding are bound to bring results.

Overstocking does not pay, and it usually results in ill-nourished and unproductive cows. It is better to keep a few cows and feed well.

Care and Maintenance of Farm Motors.

[L. Smallacombe (Taragoro).]

The motor power of to-day plays a much more important part in farming operations than it did in earlier days. Quite a number of farms are now equipped with tractor, motor car, motor truck, and a stationary engine. The farmer, therefore, needs to avail himself of some mechanical knowledge to keep each unit in working order and to obtain the best results from them, because if the owner does not understand the working of each component part and a breakdown occurs, time, inconvenience, and money is lost when a mechanic has to be engaged. A mechanic means, generally speaking, many miles travelling and several hours lost for perhaps some very trifling matter which could be remedied in a few minutes.

The Tractor.—The owner must give this unit very close attention indeed to get the maximum service from it. Tractors are costly to purchase and costly to break, and one cannot afford to take chances with a motor costing approximately £600 new. The tractor does by far the heaviest work of any motor on the farm, the engine being under full load all the time. There are very few stops and no hills to coast down, as there are with cars, to give the engine a chance to cool off. A normal tractor in good order works at ¾ throttle and does in the vicinity of 1,000 revolutions per minute all day long. A tractor requires very little attention compared to what it does in return; good fuel, good grease, and the best of cylinder oil go a long way towards minimising trouble. Fan belts must be tight and not slipping, and radiators must be absolutely free of all foreign matter or boiling soon occurs whether summer or winter. A check over of the tappet clearance occasionally—about once a week—is quite a simple matter to attend to; if valves are overhead type, rockers must be oiled or greased daily. The carburetter needs very little attention once the correct mixture is obtained. The only time a carburetter needs adjusting is when the tractor is moved from one locality to another, and then it is not always necessary. The sump requires keen attention; it must be drained regularly. Never let the oil level get too low, as the lower it gets the small quantity is circulated more often than a full sump of good, clean, fresh oil. The small quantity of oil in a low sump finally breaks down and there is no protective film left. Then, of course, run out bearings, and broken pistons and rings results. The magneto requires very little attention, a few drops of light oil weekly and a check up of the points to see if make and break platinum points are opening to the correct distance. Plugs need cleaning occasionally. This can be done by dismantling them and soaking them in a caustic soda solution over night. Valves need grinding more frequently on a tractor engine than with a car, owing to the long periods they run under high temperature without cooling off.

Before a busy period begins (usually before seeding) it is a wise plan to dismantle the whole machine, go right through from starting handle to differential, and give everything a thorough overhaul. One is sure then that every part is oiled or greased and tight, and that cogs are at their correct mesh. Most tractors of to-day either operate on low grade kerosene or crude oil. If on kerosene, it is wise to see that the manifold for vaporising the fuel is really hot. Some tractors take much longer than others. This depends a good deal on the make of machine. If the engine is switched over from petrol to kerosene before it is thoroughly hot, the kerosene is drawn into the cylinders in liquid form instead of vapourised; it then runs down past the pistons, taking the oil from the pistons and cylinders into the sump and diluting the oil.

Motor Cars and Trucks.

If a car is not giving good results in miles per gallon, very often an improvement may be made by grinding in the valves; also see that brakes do not drag on the drums. If these have been done and no noticeable improvement results, the engine may need new piston rings. If the engine has done 50,000 miles or over it is wise to have the block rebored and fitted with new piston rings and gudgeon pins. The owner then has practically a new engine. The charges for this may be in the vicinity of £6, according to type of engine, but the owner is soon repaid by the saving in oil, petrol, and the extra power he has gained. Good mileage from tyres can be obtained by buying a well known make and keeping them fully inflated. It is much wiser to have them too tight than too loose. With tyres at their present price it is not a payable proposition to get old tyres retreaded unless, of course, the owner intends disposing of the vehicle.

Stationary Engines.

An engine on a farm requires the least attention of all; they are generally of the oil type, needing no carburetter or magneto, and are only used periodically for chaffcutting, &c. If they are kept decarbonised, valves ground, and good piston rings and good fuel and oil used where necessary and when necessary, an engine should last a farmer practically a lifetime.

The Care of Harness.

[F. Chilman (Warramboo).]

Collars in particular should be well-fitting, not too tight or too loose; but a collar is better on the tight side than loose. If a collar is on the large side it is a good idea to put a bag around the horse's neck and then sit the collar down on it. If the horse's shoulder should rub, the bag could be turned back and will generally give relief. If the lining of the collar is worn and lets the stuffing out, it is a good idea to line it with a piece of bag. If much of the stuffing has gone, cocky chaff is a good substitute for stuffing collars. By patching them in this way you can get through the seeding or harvest and then send them to a saddler for relining. Winkers are often neglected, and there has been more than one bolting team due to faulty winkers; also horses are often seen with sore heads and mouths, when a little attention would prevent it.

Every farmer should keep some copper rivets of different sizes and thickness and some leather for repairs. One could reline a collar or saddle with bag, needle, and twine. Thin copper wire is very handy for most repairs to harness. Then again, copper wire is very good for mending reins and other thin leather. All leather should have a dressing of oil at least once a year. Go right through your winkers, collars, saddles, and reins and give them a good oiling. Sump oil is very satisfactory, providing there is not too much petrol in it. A dressing of oil once a year makes harness far better for handling and gives it years longer life. All harness should be kept in a satisfactory shed when not in use; weather takes more out of leather than working. Harness should be kept in a small shed close to the stable and not in the stable itself.

Jetting Sheep.

[P. H. KREUGER (Cambrai).]

To exterminate the blowfly pest it is most important that every sheep farmer should jet his sheep. In districts where the fly is very troublesome, and to overcome the pest, it may be necessary to jet the sheep twice a year. However, much depends on the season. For instance, if the season is early and shearing is done early, I would advise the first jetting about four weeks after sheep have been dipped. That jetting will last until crutching time. Crutching should be done no later than four to five weeks before lambing. While the sheep are being handled and the crutch done, give a good jetting, swabbing it well over the tail. This jetting will then last until next shearing.

How to Jet Sheep.—If you have not a spray pump or a jetting plant, put the liquid into a tin and use a brush. A paint brush, about an inch wide, would do. The present jetting plants which are on the market are not a great success. I prefer a hand spraying pump. A jetting plant is driven by a great force and makes a mess all over the yard. A small pressure pump can be regulated. With a hand spraying pump place the nozzle over the tail right on to the sheep's skin, release the tap, just swab the nozzle a little, and again close the tap. Half a cup of liquid is sufficient for each sheep. If every farmer would adopt jetting, the blowfly trouble could be overcome. If a sheep dies in the paddock and there is nothing to eat it, it should be buried fairly deep right away, shallow burying is useless. Some leave the carcass to the flies and later put a match to it. However, a maggot will only live on the sheep for seven days, then it buries itself in the ground, stays there for 14 days, and immediately it comes out the fly is ready for striking again. While the flies are around the dead sheep a lot of maggots get away; even birds will carry them.

Codling Moth Spray Programme.

Mr. M. G. Basey has asked us to point out that the paper which he read at the July meeting of the Clarendon branch on the above subject and published on page 183 of the September issue was prepared by Mr. F. C. Pyke, Ringwood, Victoria.

Activities of Women's Branches

Veterinary Notes for Housewives

Notes from an address delivered by Mr. C. T. McKenna, B.V.Sc., M.R.C.V.S., at the Women's Session of the 1937 Annual Congress.

The farmer's wife has to help in many ways in the care of sick animals on the farm, and it is proposed to deal with certain aspects of veterinary work, which it is hoped will be of help to her.

No. 1.—The Sterilisation of a Hypodermic Syringe and Needles.

The vaccination of sheep for the prevention of infectious entero-toxaemia is now recommended in those areas where the disease is prevalent.

A 20 c.c. "Record" syringe with a strong hypodermic needle attached is used to do the inoculation. As the operation must be carried out in a clean manner it is necessary to sterilise the hypodermic syringe and needle. This is done in the following way:—

The plunger is first removed from the glass barrel, and the latter is then wrapped in cotton wool. A piece of string is tied around the wool to keep it in place. The object in putting the barrel in wool is to prevent it from being broken whilst being boiled. These syringes are expensive. They cost 11s. 6d., and it is not possible to obtain spare parts.

The parts of the syringe and the hypodermic needles are now placed in a clean pot containing cold water. This is then brought to the boil and kept boiling for 10 minutes. After sterilization the syringe should not be assembled until it is cold, and when doing this handle carefully and as little as possible, and wrap up, together with the hypodermic needles, in a piece of clean old linen. It is then ready for use.

No. 2.—The Nursing of Sick Animals.

This is just as important as the administration of medicines, and, in fact, too much reliance is placed on drugs and insufficient attention is bestowed upon the comfort and well-being of the patient.

The value of open air and sunshine for a sick animal, cannot be over-estimated, but it is frequently necessary to provide them with shelter. In this case the quarters should be dry and warm and above all, they should be such that the patient has plenty of fresh air.

The animal should be kept warm with a rug and bedding. The former should be removed and aired during the warm part of the day and the latter should be changed daily. Grooming is of value. Cows which are down, should, if necessary, be turned from side to side every three to four hours. They should never be slung.

Suitable feed is a most important consideration. The rule should be to give the sick animal a little and often of what it will eat. If it does not, within a reasonable time, eat the food which is placed before it, it should be removed.

In the case of digestive disturbances, it is desirable to let the patient starve for a time. Food should not be forced on to a sick animal.

It is also necessary to see that the utensils, manger or feed box, are kept scrupulously clean.

A supply of fresh clean water should always be available for the animal.

Some common invalid feeds are:—

(*a*) ***Bran Mash.***—This is a light laxative food which is often relished by a sick animal.

To prepare, put 3lbs. of bran and 1oz. of salt in a clean bucket, and add 2½ pints of boiling water. Mix, cover with a sack, and allow to stand for a quarter of an hour. Give when cool. Cattle appreciate the addition to the mash of a little treacle.

(*b*) *Linseed.*—This is prepared by barely covering the seed with water. It is then boiled slowly until it becomes of the consistency of jelly. One-half to one pound daily may be added to the food and the water in which it has been cooked may also be mixed in dry feed which is given.

It should be prepared fresh each day.

(*c*) *Oatmeal.*—This is used as gruel or porridge. The latter is prepared by boiling 1lb. of oatmeal in a gallon of water, until it becomes thick. The addition of milk or sugar adds to its nourishing qualities.

(*d*) *Hay Tea.*—Select some long sweet hay and fill a large bucket wth it. Pour in boiling water, cover with a thick sack, allow to stand, and then strain. The liquid forms a nourishing drink, much relished by some animals.

(*e*) *Scalded Oats.*—These are prepared by covering oats with boiling water until the outer husk has softened. These may be added to a bran mash or fed in small quantities. Long sweet hay is frequently taken by the larger animals when they will refuse other feed.

Skim milk is a nourishing feed and is often relished by a sick animal.

A small amount of green feed (lucerne, thistles, etc.) is also often much appreciated by the patient.

No. 3.—Diarrhoea in Calves.

Diarrhoea is a symptom of an irritation of the digestive canal and is an attempt by the animal to get rid of the irritant by washing it out. The disease is very common in calves.

Some forms of diarrhoea in these animals are due to bacteria and this type is frequently associated with the use of dirty calf yards, pens, etc.

Other types of the disease are due to faulty management such as:—

1. Over-feeding and drinking too quickly;
2. Cold, stale, or frothy milk;
3. Using dirty utensils;
4. Sudden changes of feed.

Treatment consists in isolating the affected calf, and removing all the healthy ones on to clean ground.

The sick animal should be given 1-3ozs. of castor oil in a little warm milk, starved for 24-48 hours and then the calf should either be allowed to suck its mother or given warm milk in small quantities, at frequent intervals.

Limewater at the rate of 1 cupful per gallon of milk and Formalin at the rate of 1 teaspoonful per gallon of milk have some preventive value where the condition is prevalent. If the calves show evidence of constipation when Formalin is used, it should be discontinued.

Preventive measures are, briefly:—

1. Change yards and stands frequently.
2. Isolate any calves showing diarrhoea;
3. Keep utensils clean. Use washing soda and water.
4. Changes of food should be gradual.

No. 4.—Strychnine Poisoning—Dog.

Dogs frequently pick up baits containing strychnine in sufficient amounts to cause poisoning.

The symptoms are convulsions alternated with periods of complete relaxation. During the convulsions the head is drawn backwards, the fore and hind limbs are extended and the trunk is bent backwards. If the nature of the seizure can be recognised sufficiently early, an emetic should at once be administered.

One of the following should be given between spasms, and repeated every half hour until improvement occurs:—

1. Zinc Sulphate, 3-10 grains in 2ozs. of warm water.
2. Mustard, 1-4 teaspoonsful mixed in several ounces of warm water.
3. Tobacco, 4ozs. in a pint of boiling water. Cool and strain (do not repeat this drench).

No. 5.—Distemper in Dogs.

This is a common and highly contagious disease of dogs. Young dogs are very susceptible to it. The symptoms vary, but usually there is great prostration and loss of appetite. There is a discharge from the eyes and nose and there may be a cough. Vomiting is often seen and diarrhoea may be present.

The course of the disease is not appreciably affected by the employment of drugs, but careful nursing is of great value. The dog should be made warm and comfortable and his surroundings kept clean.

Discharges from the eyes and nose should be wiped frequently. The diet should consist solely of milk. No meat should be given.

An aspirin should be powdered up and given in milk three times daily. Brandy is of value if the animal is weak.

ALAWOONA.

Mrs. Jeffrey occupied the chair at the August meeting. Mrs. Watson read a paper "Different Ways of Preparing Rabbits." Mrs. Hartley won the Fruit Cake Competition. (Secretary, Mrs. Cooper.)

AUBURN.

The annual meeting was held 27th August. To maintain interest a competition will be held at each meeting. 23 members were present and 4 new members were enrolled. Miss Tansell reported on the Adelaide Congress. Mrs. B. Allen and Miss E. Dennison were the successful competitors in the Marmalade Competition. (Secretary, Miss L. Dennison.)

BALHANNAH.

A yearly programme of meetings was arranged on 18th August. Mrs. Middleton presided at the September meeting when reports of the Adelaide Congress were received. (Secretary, Mrs. P. Grow.)

BALUMBAH.

Members met at Mrs. A. Wohling's residence on 26th August. Conference and Congress agendas were discussed. Congress reports were submitted on 29th September. (Secretary, Mrs. H. Jericho.)

BEETALOO VALLEY.

Mr. J. A. Lyons, M.P., addressed members on his recent tour overseas on 16th August, and delegates reported on the Annual Congress at the September meeting. (Secretary, Mrs. E. Pearce.)

BELALIE.

Officers were elected at the annaul meeting held on 13th July and Mr. M. A. Pyne, M.A., spoke on "Dictatorships."

A Day in the Life of Master 18 Months Old.

The following paper by Mrs. J. Murchland was awarded first prize in a competition held by the Belalie Branch:—

About 6 o'clock he awakens, and is attended to by either his father or mother, who slip on him a woollen wrap and give him a drink of orange juice. He is made comfortable, and is put back into his cot to play. A wise parent avoids the use of "baby-talk" which has to be unlearned later. A toy is tied to the side of his bed, and another put in with him, where the young man must remain until he is sponged and dressed.

If the weather is mild, the little chap will wear a lightweight vest, blouse and button-on pants, but chilly days demand a woollen vest and suit. Many children find wool irritating to the skin, so it is wise to avoid friction by placing a thin silk vest next to the body. If woollens are chosen, they should be soft, not matted through use, and sufficiently loose to allow freedom of movement. The sox, too, must be large enough, and are better if shaped to the foot; in any case they should not be sharply pointed to the middle. If shoes are worn they should be of the natural shape of the foot. Over his other clothing Master 18 Months Old needs a pair of overalls.

Breakfast follows at 8 o'clock. A suitable menu for the infant of this age is porridge (with salt) and cow's milk, followed by baked bread, toast, or home-made rusks and butter, and either a lightly boiled egg, or a little steamed fish may be added. A drink of milk follows, and the meal finishes with a piece of ripe apple.

Baby is then placed on his toilet-chair, after which his hands and face are wiped with a damp cloth, and his teeth may be brushed with a soft small brush dipped in a solution of ½ tspn. of salt to a glass of water. Afterwards, the brush must be well rinsed and hung to dry.

The morning presents a problem to the busy mother. Master 18 Months requires freedom if he is to develop by means of exploring, yet he must be guarded from harm, as he is still unable to decide which things are really dangerous. If the weather is suitable, the child is better out of doors, so his playground is carried out on to the verandah. If there are older children in the family he may even be allowed to play with them in a small, well-enclosed back yard. A balustraded verandah can usually be shut off to make a large playground. This allows plenty of freedom, but if the space is small, baby must not be left cooped up too long in his pen.

If none of these is possible, or if the weather is inclement, the little pioneer must remain indoors in his "Baby-proof" home. All valuables and breakables must be kept out of reach, any sharp utensils must be put right away, all medicines and poisons must be shut away in the chest, and the door locked. It is educational for him to turn out a saucepan cupboard, as he attempts to fit one in another, or tries to place the various lids in their correct places. Brightly coloured wooden toys also appeal at this age, but care must be taken to see that the paint does not easily rub off.

The wise mother having taken these precautions leaves her child to entertain himself. She does not rush to assist him every time the string of his toy becomes entangled around the table-leg nor even when he stumbles and falls. "One lesson of experience is worth a hundred 'do's' or 'dont's'." At this age the over-anxious parent may do much to spoil the child's individuality, and may even make him frightened and nervous by her thoughtlessness. The infant has to experiment again and again before he knows the world around him, and his many knocks and tumbles teach him his powers of touch, taste, sight and movement.

Baby should be held out at regular intervals during the morning, and if the weather is warm he will appreciate an orange drink or a drink of cold boiled water. This also cools the mouth and system when he is teething. At mid-day he is ready for his bath.

This should be given in a warm corner of the room, well-protected from draughts.

Everything should be in readiness before commencing, to avoid unnecessary delay. The eyes, ears, lips, and all other folds of the skin will need careful attention to be thoroughly cleansed. A flannel, not a sponge, should be used in the bath. The latter harbours germs, but the piece of material can be frequently boiled.

The Mid-Day Meal.

The most substantial meal of the day then follows at 12.30. It should consist of one of the following:—Meat, fish, or poultry with green vegetables and steamed or mashed potatoes accompanied by meat broth, pea soup or gravy. At this age avoid all fried foods. The second course may be milk or custard pudding, or junket with baked apple or stewed fruit. A hard crust, a piece of ripe apple, and a drink of water complete the meal.

Master 18 Months Old should always be seated in his high chair, securely fastened with safety straps, whenever he is given anything to eat. No pieces should be given between meals, but he still enjoys a bone which may be given while the dinner is being dished. A number of new foods are introduced about this time. Baby may refuse them simply because the tastes are unlike what he has already experienced. For this reason it is wise to serve a fresh food at the beginning of the meal while he is still hungry. Solid substances require thorough mastication. Perhaps the easiest way to teach this is for the mother to sit in front of the child and with every mouthful of food which he takes to make a continued chewing motion of her own jaws and lips. Children are born imitators, and soon the child will have mastered the process of slow eating and thorough chewing, which make the teeth strong and keep them clean.

Most infants of this age are very anxious to feed themselves. A wise mother, instead of checking this impulse will attempt to train it. She gives him a spoon in his right hand, but feeds him also with another spoon which she holds. At first practically all the food will be taken from her, nevertheless baby slowly learns to help himself under direct guidance and encouragement. This may at first seem tedious until the parent realises that she is fostering independence, as well as training in good table manners.

The child is again taken to the bathroom and his toilet attended to. Then he has his mid-day rest in a quiet bedroom. This sleep should last for at least 1 hour, many infants will remain in their cots for a longer period.

On awakening the little one has another orange drink. At this age he enjoys the juice of a large orange every day. It is diluted with ¾ of a pint of cold boiled water and half is given at each drink. This does not mean that the day's ration is prepared at one time; freshness is essential. The quantity of water may seem large, but every infant requires plenty of cold water daily, and most babies appreciate the orange flavour.

Sunshine and Fresh Air.

This may be merely supervised play in the garden or he may accompany his mother in shopping or visiting.

If the air is at all chilly the young man must be warmly clad, for a baby has proportionately a much larger skin surface than an adult, and so is more easily affected. Cold air is invigorating only when the child is suitably clad. No sudden change must be allowed in the weight or amount of clothing worn. If a pusher is used and the weather is cold, place a wrap in the cart, then seat the little chap, fold the wrap around the legs, up over the feet and pin it securely at the top. For an infant who has to use a pusher regularly a coat and leggings suit is a wise investment, provided the mother removes them immediately on going indoors, The outing must not be so long as to weary the child; if possible, allow him a short break in which to walk about before his homeward ride, and never prolong the trip to such an extent that he may fall asleep in his pusher.

It is good for baby to accompany his mother when she goes visiting; he becomes accustomed to meeting strangers, and learns to be at ease with others besides his parents. This does not mean however, that he can be expected to sit motionless in one place for an hour or longer. The sensible mother will take with her a pair of overalls, and a bag or box of toys which will keep his fingers and mind occupied. Blocks or boxes that fit one within the other, or even half a dozen pegs are preferable to a woolly toy that simply stays where it is put or thrown.

On his return the little one is again made comfortable, and will enjoy a quiet play while tea is being prepared. Every woman with a baby should endeavour to give at least half an hour daily to mothering her child, that is, not simply attending to his physical needs, but assisting in his development. The afternoon is the most suitable time for many. The average infant of this age understands the meaning of "Yes" and "No," but it is useless to expect him to remember over long intervals those things he may not do. The voice should never be raised in speaking to a toddler, but it is possible to control his actions partly, at least, by the inflection of the voice and what is said. If, however, he fails to respond to a quiet "No," the parent must calmly remove him from the temptation as she repeats the word, and interest him in something else.

A quick sponge preceeds tea at 6 o'clock. This is the lightest meal of the day, and consists of baked bread, rusks, or toast with butter or jam, and is followed by milk or weak cocoa to drink—always keep any beverage until the end of the meal. A piece of ripe apple is given after baby has finished. This must be thoroughly chewed, and the child can be taught to do all this by being given a whole ripe peeled apple. He will spend a long time in sucking, nibbling, and rubbing, and will soon come to love the taste. The average infant of 18 months may eat a whole ripe apple per day. After tea, wash the little one's face and hands. Clean his teeth, hold him out, and then take him to his bed. If at all possible he should have a room to himself, but if it has to be shared place his bed right away from any other person in the room, and where it will not be in the direct line of draught.

It is most important that the window should be open, and the blind raised enough to allow a free passage of air. If the cot would otherwise come into the line of the draught protect it by means of a screen or place a piece of wood to entirely fill the cavity made by raising the lower sash. This will force the air into the room at a higher level, between the two sashes. The bed-clothes should be light, but warm. Some babies of 18 months still require a napkin (much depends upon the season of the year), and their beds must be prepared with a waterproof sheet well covered by a thick soft cloth placed under the sheet. The room should be airy—not crammed full of furniture and ornaments, and all superfluous clothing must be neatly put away. So Master 18 Months Old ends his day in a pure fresh atmosphere which will do much to keep him in good health.

His day seems at first glance to consist of an endless repetition of small happenings, followed by another similar to the last. Certain variations are possible from the routine that has been given—the time of the daily bath will vary to suit each household, and the diet is often changed to suit an individual child, but the strict adherence to routine is still necessary. It is the only means of the infant securing healthy development of body, mind and character.

Mrs. J. A. Lyons, of the Georgetown Branch, addressed the September meeting on her trip abroad, and on 5th October, Mrs. D. Brooks gave an address, "Vocations for Girls." (Secretary, Mrs. E. L. Orchard.)

BOOR'S PLAINS.

The meeting of 5th August, took the form of a question box. On 2nd September, Mrs. H. Queale read a paper "A Trip through Victoria." (Secretary, Miss L. Stanway.)

CLARE.

Twenty-seven members attended the September meeting. A paper, "Harmony in the Home," was presented by Mrs. Jeffrey. On 2nd October, 38 members were present. Mrs. Blight spoke on making useful articles with wood fibre. (Secretary, Mrs. A. Pollock.)

COONALPYN.

Mrs. E. Hanna gave a talk on "Smocking" at the August meeting. The Branch acknowledges the receipt of books, &c., from Snowtown. Biscuit recipes were exchanged at the September meeting. (Secretary, Miss E. George.)

COONAWARRA.

Mrs. Carman delivered an address, "Rules of the Road" at the September meeting which was attended by 32 members. Officers were elected on 25th August. (Secretary, Miss O. Lear.)

GLADSTONE.

Thirty-five members were present at the August meeting. Mrs. F. Wienert gave a demonstration of Pastry Making. On 7th October, members of the Narridy Branch took charge of the meeting. (Secretary, Mrs. L. J. Sargent.)

HOPE FOREST.

At Mrs. Jeffries's home on 5th August, members were given a demonstration of rug making. (Secretary, Miss. M. DeCaux.)

KALANGADOO.

Sandwich filling recipes were exchanged at the August meeting which was attended by seven members. (Secretary, Miss. W. Dangerfield.)

KANGARILLA.

On 19th August members held a recipe afternoon, and on 23rd September reports of delegates to Congress were received. (Secretary, Mrs. M. Steer.)

KARTE.

Meals for the Toddlers.

Mrs. W. Trowbridge read the following paper at the meeting held on 1st September:—Many mothers find a difficulty in choosing a menue for the little toddlers who are over 2 years of age. They are not quite the same as the "grown-ups" and mothers feel that they want to give these little growing things the very best chance in life, by giving them food, which they will eat and enjoy, and food which will give the best results in regard to growth and development.

When considering the preparation of these, one must think not only of the nutritive value of the food, but also introduce as much variety as possible. Children can so easily "turn against" a dish when served too often, just as adults do. When beginning a new food with the smaller ones of 12 months to 2 years of age, it is necessary to only give small amounts, to accustom them not only to the taste, but also to the "feel" of the food in the mouth, which is so vastly different from the baby diet to which they have been accustomed. Care must also be taken not to give too much "pappy" foods, as the child must learn to chew and masticate the food properly, as it helps digestion, and also in the preservation of the teeth. Hard crusts, rusks, &c., should be given.

SUGGESTED MENUS.

From 12 to 18 months some of the following may be given:—Breakfast groats made as follows:—Put ½ tblspn. groats into a basin, mix smoothly with 1 tblspn. water. Pour over ½ pint boiling milk, stirring mixture well. Put into saucepan and cook for 10 minutes. Sweeten with sugar. This may be varied with "Oatmeal Jelly":—1 tblspn. oatmeal, 1pt. of water, soaked over night; then boil for 20 minutes, salt to taste, sweeten with a little sugar. This must be strained. Any breakfast cereals may be given with milk. In summer this is preferable to the oatmeal, which is sometimes found a little heating for some children. Rusks, crisp toast, and butter are included in the diet, with the usual milk mixture which should also be included for the older children, as it is necesary for them to have at least 1 to 1½ pints of milk daily. White meats may now be added to the diet—any of the following:—Brains, fish, tripe, a little tender minced rabbit or chicken prepared in the following way, and given in small amounts, 1 tpsn. to commence, and later 1 to 1½ tblspns. Brains. 1 set of brains, 1½ tspns. salt, 1pt. water. First wash the brains and soak in the above mixture for 1 hour. Strain off the water and throw it away. Skin brains carefully, plunge into saucepan of boiling water, with ½ tspn. salt. Boil for 15 minutes, strain off water and serve with white sauce.

Some children do not like the taste of brains, but if mixed with vegetables, it is not so noticeable. If the child does not like the sauce it can be omitted. Fish—¼lb. fillet of fish, a little salt, small piece of butter. Sprinkle fish with salt, have ready a saucepan of boiling water; place over saucepan a slightly buttered plate, place fish on this and cover closely with a saucepan lid. Steam from 15 to 20 minutes, turning at half time, until flesh is quite white and will separate easily from any bone that is left in the fillet. Remove skin and serve on a hot plate, a little white sauce may be poured over this, or a little butter added. The toddlers generally will like this dish and it is most nourishing for them. Whiting is particularly nice done this way and only takes a few minutes to cook.

Tripe—2lbs. tripe, ½pt. water, same of milk, one onion, 1 tspn. cornflour, salt to taste. Cut tripe into small pieces and put into cold water and boil for 10 minutes. Take it out and scrape it and throw away the water. Put into clean saucepan with the milk, water and salt the onion whole. When boiling draw saucepan back and simmer gently for 2½ hours, thicken with the cornflour. When these white meats are not available a small amount of chicken or rabbit which has been finely minced may be given.

VEGETABLES.

Amongst the vegetables which may be given to toddlers, are the following:—Vegetable marrow or pumpkin (mashed) or sieved potatoes, the floury part of the baked potatoe being the best. Sieved or mashed carrot, parsnips, swede turnips (well cooked), tender young cabbage and Brussels Sprouts. Spinach is not so easily digested, but if cooked in very little or no water and squeezed thoroughly, the juice is very valuable, as it contains a large amount of mineral salts. Tomatoes are also excellent, but should be given gradually. Tomato soup is good and made as follows:—2lbs. tomatoes, 1½ozs. butter, 1½ozs. flour, 1¼pts. water, ¼ tspn. sugar, and a little salt. Put tomatoes and stock into a saucepan and boil gently for ¾ of an hour, put them through a fine sieve, put the butter and flour into a saucepan large enough to hold the soup, set on the fire, and stir together until they are a smooth paste, add the strained soup by degrees, and stir one way until it boils and thickens, add sugar and seasoning. A few spoonfuls of the above could be given once or twice a week.

If a toddler craves overmuch for red meat, cut up ½lb. of good beef steak, sprinkle with flour, and salt to taste, and allow it to stand for about an hour, then just bring to the boil. Give toddler a cupful every day: it is the taste he craves, not the solid meat. Beef tea made in this way is also economical, as after removing the toddler's share, water can be again added and with onion, vegetable, and dumpling made into a nutritious dish for school children or adults. Liver juice may also be given 2 or 3 times a week, starting with 1tspn. and increasing the amount gradually. This may be added to broth and mixed with vegetables, and is made as follows:—Mince ¼lb liver, place in a screw-top jar, with 2 tblspns water and pinch of salt, place in a pan of water and simmer for 20 minutes. The juice from lightly grilled steak may be given to children under 9 months.

Mutton Broth:—Remove surplus fat from the shank, cover with 2pts. cold water. Bring to boil and simmer for 3 hours; 2 tblspns. of rice or pearl barley may be added when water comes to boil. Salt to taste.

EGGS.

Eggs are such a very valuable asset in arranging meals for children, that some recipes including eggs in their make-up may be of service. What is usually called a "boiled egg," should really not be boiled at all. The water should be brought to the boil, the egg placed in it, then drawn to the side of the fire and left in the water just off the boil for 5 minutes. Many children like the egg to be removed from the shell and placed in a pretty dish, with a little salt, butter, some bread crumbs, and a little milk added, others may prefer it in the shell with a little salt and a little spot of butter. Scrambled egg can be a delightful dish, but it is often spoilt in the cooking; it should be eaten hot from the pan.

The meal should be quite ready, so that the egg may be scrambled at the last moment; a slice of nice, crisp, buttered toast should be prepared and kept hot, a lump of butter about the size of a walnut should be placed in a small saucepan and allowed to thoroughly melt. The egg is then beaten up with a tblspn. of milk and a pinch of salt, poured into the heated pan and cooked over a medium heat, stirring all the time, until thick and slightly broken. Place on the buttered toast and garnish with a sprig of parsley. With scrambled eggs, many variations can be made; these variations are important to a child. All sorts of odds and ends can be added at different times. A little tomato or asparagus, or sweet corn, some bacon or minced ham or sardines, in fact just a few tspns. of almost any "left-overs" may be mixed in with the egg before it is cooked. Very attractive little fire-proof bowls in all colours can now be procured for cooking such dishes as buttered eggs and other odds and ends.

Buttered eggs, either baked or steamed are usually a great favourite with children, especially if served in these charming little dishes. The dish should be well greased with butter, a nice fresh egg broken into a cup and carefully poured into the greased dish. Some salt and a small lump of butter are placed on the top. Cook in a moderate oven until the white is just set. If the egg is to be steamed a piece of buttered paper is placed over it and the little dish placed in a saucepan of boiling water and covered over. Cook until white is set. To make a variation, a little cooked tomato pulp or spinach, or mashed carrot, or some such vegetable, or grated cheese may be placed in the bottom of the dish, with egg on top, or a little marmite may be spread on top of the egg, just to alter the flavour.

TOMATOES.

Tomatoes are very appetising and nourishing, and contain many vitamins. They can be served in many ways. Stuffed tomatoes make a very attractive dish. Choose nice large firm tomatoes, cut the centre out, and mix with 1 tblspn. white sauce, 1tblspn. grated cheese, 2 tblspns. bread crumbs, and pinch of salt. Fill tomatoes with this mixture, put in baking dish in moderate oven for about 15 minutes. These may be served on toast, made into rounds, and a little sprig of parsley placed on each. Tomatoes and rice are usually well liked, and make a good tea dish. Boil 1 tblspn. of well washed rice and piece of onion in plenty of water for 20 minutes, strain, and put back in saucepan with a piece of butter the size of walnut, 1 large tomato, which has been previously dipped into boiling water and skinned, a little salt and ½ tspn. marmite. Simmer gently until tomato is cooked. Serve on toast with small piece of crisp bacon.

SWEETS.

In menus for children, sufficient variation is often not made in regard to sweets. Most children dislike plain milk pudding. There are many ways of getting in the same ingredients in such a way that the mother would have no bother in getting her child to take sweets. Stewed fruit, such as apples, pears, pulped prunes, apricots and peaches may be given with any of the following sweets:—Steamed custard made as follows:—Beat up yolk of egg, add 1 cup of milk with 1 tspn. sugar, add a little flavouring, stand this in a pan of boiling water until set. Then there is junket and boiled custard and plain milk jelly as follows:—½oz. gelatine, 1pt. of milk, 1½ tblspns. sugar—cooled boiled milk should be used to make this recipe. Soak the gelatine in the milk for ½ an hour. Then put in the sugar and place on the fire until nearly boiling and gelatine all melted. This is very nourishing for children and easily digested.

Flummery is made thus:—Juice of 2 large oranges, 2 tea cups water, 1 tspn. of sugar, 1 tblspn. each flour and Davis's powdered gelatine. Put flour, sugar and gelatine into a saucepan and mix gradually with water, then bring to the boil, and remove from stove, add juice of oranges and set aside until quite cool, but not set, and whip until nearly set (about 10 minutes). Pour into a wet dish, instead of water, a syrup from certain stewed fruits, prunes, pears, peaches, and pineapple; if syrup is used a little less sugar should be added. Other dishes are prune pulp, prune jelly, and blanc mange.

Caramel custard:—2 eggs, a pint of milk, 2 tblspns. sugar. Moisten a tin plate under the tap and put sugar on the wet plate, put on a very slow fire and leave until the sugar is a sticky dark-brown colour. Then add 2 tblspns. of water and boil until all the sugar is mixed with the water. Beat the egg well, add the milk. Line the piedish with caramel, pour the custard into dish and place dish in pan of cold water; put in a very slow oven and cook until set. It must not be allowed to boil.

Apple Meringues.—Stew 1lb. apples in water until they mash, add a little butter and sugar. Separate yolk from white of egg, beat white stiffly and add yolk to stewed apples, which should be slightly cooled. Pour the apple into a piedish and place the white on top in a rocky heap, dredge well with castor sugar and bake in a hot oven for a few minutes, just enough to colour the meringues lightly.

Prune pulp is especially good for the child, and often helps in cases of slight constipation. Take ½lb. prunes, wash thoroughly in cold water and soak overnight; in the morning place on the stove in the same water and cook until tender. Put through a sieve and add sugar if desired.

A quiet, happy atmosphere is as essential to the successful meal, as the choice of food provided. How can the small child enjoy his breakfast with the mother shouting, "If you don't eat that porridge, you will go back to bed," whilst she eats much more interesting looking toast and marmalade herself? The morning lunch at a kindergarten is an example of how a meal should be arranged for children. The child sets the table, puts the flowers on it, washes his hands, and sings the grace; happiness abounds and very rarely is a crumb of food left on the child's plate, or a drop of milk in his mug. To ensure a good appetite the child should have three regular meals with nothing more than a drink of water or some fruit between—they must be given scope for active play out of doors. At meal times, all anxiety on the part of the mother must be abolished or hidden, and if the whole family have their meal together, all should eat the same, the adults eating what is suitable for the child, never the child being given the many undesirable things eaten by adults. The adults would benefit greatly by this scheme too, and would find that the broth, grilled chops, vegetables, baked apple and milk of the child's lunch much better than the usual corned beef and pickles, tea and bread. Children should be allowed to have a few plain boiled sweets as part of their diet, but there should be a firm rule of no snacks or sweets between meals. Remember that tea and coffee are as harmful to children of any age, as ample pure water is necessary and good.

If food is cooked properly and sufficient variation is given, and the meals are made really attractive there would not be nearly so many "difficult feeders" which are the worry and distress of mothers and nurses all the world over.

At the September meeting Mrs. W. Trowbridge read an instructive paper "Child Training." (Secretary, Mrs. F. Atze.)

KOOLUNGA.

Papers on "Women in Public Affairs" were read at the August meeting. "Qualities that go to make the Good Hostess" was the subject of papers read at the meeting held on 16th September, which was attended by 25 members. (Secretary, Mrs. E. Whitehorn.)

KYBYBOLITE.

At the August meeting Mrs. W. Black gave a travel talk and on 5th October, reports of delegates to the Annual Congress were discussed.

Management of Poultry on the Farm.

Mrs. C. Hahn read the following paper at the September meeting:—

Our district is not well situated for commercial poultry farming. In the first place, the winters are usually very wet and cold and to get the best results from the laying hens it would be necessary to house the birds day and night during the winter. This means a greater outlay of capital, and maintenance costs would be increased. Again we are a long way from markets and costs of freight and breakages in transporting the eggs means approximately another 1d. to 1½d. per dozen eggs more than a competitor who has his poultry farm situated close to the market. The same applies if selling surplus fowls, or raising poultry for the table. We also have to pay more for grain, pollard, and bran, etc., which amounts to about 6d. per bushel on wheat, and £1 per ton on bran or pollard.

The farm would indeed be poorly managed if it did not have its few fowls to supply the house with sufficient eggs for use in the home, and to have a few surplus fowls occasionaly to provide a tasty dish for the table, and with enough eggs left over for the wife to sell to provide herself with a few extras.

Having decided on the breed of fowls and the number that can be accommodated, make inquiries and see that they are obtained from a reliable poultry breeder. To start one can either buy the eggs and hatch them in an incubator or purchase the day old, or week old chicks. This method has its advantages, in that providing care is taken in raising the chicks, a start can be made with good young fowls that usually start to lay early, and lay well during winter, when egg supplies are short and values high. The most satisfactory, and certainly the most interesting method to start is to buy a pen of tested 2nd year hens and cockerel, and start the flock from reliable tested stock.

HOUSING.

It is essential that the fowls have shelter: it should be warm, and free from draughts with plenty of ventilation. For 50 fowls with a large yard to run in, or allowed free range, a shed of galvanised iron 8ft. x 10ft. x 6ft. high will be required. The shed should have a concrete floor, and face the east. About 3ft. of the front should be left open on the top and covered with netting only to allow for ventilation and to admit early morning light. Roosts or perches should be of uniform height, from 1ft. to 18in. above the floor level. When some perches are higher than others, fowls naturally try to get the highest perch, which causes crowding. Sheds, floors, and nests should be kept clean, and disinfected often, also the water vessels. It is in dirty houses and water that germs and diseases are started. A keen look-out should be kept for vermin, ticks and mites being the most troublesome. All woodwork should be sprayed and all perches, nests, cracks, and crevices saturated regularly, or whenever there is any sign of vermin, with some strong disinfectant or kerosene. Kerosene and sump oil mixed is very effective. A dust bath for the fowls is a great help in checking vermin. If a heap of ashes is placed in the yard or shed and kept dry, the fowls will dust themselves and remove any vermin that may be left on their bodies.

FEEDING.

This is one of the main points of poultry management. It is a waste of money to buy or breed good fowls, house them well, and then undo all the good work by only half feeding or over feeding them. Fowls on the farm where they have free range, or a large yard to run in should be fed at least twice a day. If they are in a small yard where they cannot help themselves to insects, worms, and greens, &c., they should also be given a feed of chaffed greens at midday. The morning feed should consist of a mash made of 1 part of bran scalded with hot water, to which meat meal at the rate of ½ to ¾lb. per 100 birds has been added. This mash is dried to a crumbly mash by the addition of an equal part of pollard; about 2ozs. per bird of this mixture for adult birds. Greens should be made available particularly in summer; 2ozs. of grain fed on a good litter of straw constitutes the evening feed. Feeding the grain on the straw makes the fowls exercise, and plenty of exercise means more and better eggs, also stronger and healthier chicks. If the fowls become too fat, which is easily seen by the shell on the eggs usually having high ridges, and eggs also very thin in the shell, decrease the quantity of pollard in the mash and increase the quantity of straw in the scratching litter. Soaked grain has been tested recently in place of mashes for morning feed, and is giving satisfactory results, but still not the same returns as with the mashes. On the figures quoted it would take to feed 100 fowls for 12 months approximately 25 bags of wheat and 1 ton each of bran and pollard; or if soaked wheat is used instead of mashes, approximately 40 bags of grain. Plenty of clean water should always be available to the flock, and should be kept in the shade. Water in troughs where the sun shines on it soon becomes stagnant, and causes disorders. If ducks or geese are kept they should not be allowed access to the same drinking vessels. Fowls dislike and object to water that has been contaminated by ducks and geese.

Select carefully the breeding fowls and breed only from hens in their 2nd season, and older, that lay eggs of 2 to 2¼ozs. All cockerels that are not wanted for breeding purposes should be fattened and marketed as soon as possible. Always separate cockerels from the main flock as soon as the sex can be determined. Infertile eggs always keep better, and if guaranteed infertile will always command a better price. The main hatching should be done in September or early October. Always try and have sufficient breeding hens so that eggs can be set under hens, or in the incubator, that are not more than a week old. See that breeding hens do not get too fat; if they get plenty of exercise they will produce healthier and more vigorous chicks that will be much easier to rear to maturity. Always have plenty of shell grit and charcoal available so that the fowls can obtain same when needed. Shell grit also improves the texture of the shell. Remember that a hen for laying is not recognised as being profitable after the second laying season, only the hens that have been proved as good layers should be kept for breeding purposes. After this age the others should be fattened, and marketed to make room for pullets. It is only by breeding every year so that pullets are ready to start laying when the other hens go into the moult, that a constant supply of eggs can be maintained. If the pullets are raised too early, so that they start to lay in February or earlier they then usually go into moult with the main flock, and the benefit of early pullets is lost, but if they are hatched and brought to maturity so that they start to lay about the end of March or early April, they usually—if well cared for—continue to lay right throughout winter. The heavy breeds usually take a month or 6 weeks longer to mature than the lighter breeds. The heavy breeds from 5½ to 6 months, whilst thhe lighter breeds—if well cared for—will start at from 4 to 5 months to produce eggs. (Secretary, Miss M. Moore.)

LAURA BAY.

The August meeting was held at Mrs. W. Bowell's residence. Mrs. A. Bowell gave a demonstration of making artificial flowers. (Secretary, Miss. R. Blumson.)

LOBETHAL.

The Secretary, Miss W. Schapel, reports that during the past 12 months 11 members have been added to the roll. A Lamington Competition held on 19th August was won by Mrs. P. Kerber.

MALTEE.

Mrs. J. Schwarz read a paper, "Simple Rules to avoid Lung Troubles," at the 19th August meeting. The successful competitors in the Scone Competition were Mesdames J. Bassham, L. Martin, and Miss D. Blumson.

Brightening the Home.

On 28th September Miss A. Bassham read the following paper:—

Fresh clean walls make a marked difference to a room and kalsomine is one of the simplest and cheapest means of refreshing them. The articles needed are 2 good brushes, one 4in. to 6in. wide and a smaller one. A 5lb. packet of kalsomine costs from 2s. 6d. to 3s. 6d. and will cover from 300 to 400 square feet, depending on the smoothness or otherwise of the walls. If rough a packet will do less and the surface will probably require a second coating. Always soak the brushes in cold water before using. Cream walls and ceiling always look nice and cool and harmonise with any colour furnishings. For a living room, it is better to have a darker shade for the first 3 or 4 feet. When doing the ceiling wear a pair of motoring goggles.

Clear the room of all furniture and spread newspaper over the floor. Mix the kalsomine in a bucket exactly as directed on the packet and if a sliced prickly pear leaf is allowed to bleed in it, the paint will stick more and give a smoother finish. rush it on freely and quickly and allow no edge to dry before coming back to it with a wet brush. Before washing a second time, be sure that the first one is thoroughly dry.

Old and shabby woodwork can be improved by re-staining and varnishing. The kitchen, living room, and bathroom furniture can be brightened by painting it with a quick-drying enamel. Gay curtains will make the finishing touches. Lace and floral muslin or voile curtains made in a cross-over design, give an airy appearance to the room. (Secretary, Miss L. Schwarz.)

MANGALO.

Icing a Cake.

At the August meeting Mrs. G. Payne gave a demonstration of icing a cake, and made the following remarks:—

Place a layer of almond paste on the cake first to prevent discolouration. Put ½lb. blanched almond kernels through the mincer. Mix ½lb. icing sugar and the yolks of 2 eggs, and a litle flavouring. Apply to top and sides of cake and leave to dry for at least 1 day before applying the royal icing. See that the icing sugar is free from lumps. Put 2 egg whites in a basin and whisk thoroughly. Gradually add 1lb. of icing sugar and beat with a wooden spoon until the mixture is fairly stiff, then add a little lemon juice and beat briskly and thoroughly with a wooden spoon. Continuous beating makes the icing clear and pliable. Pale shades of colour look best and any flavouring desired should be added last of all. The cake should be of a good shape and brushed over with egg white before any icing is applied. The icing should be sufficiently stiff to spread easily, but to stay where it is spread. Have a jug of hot water at hand in which to dip the spreading knife. Having completed the first and second coating the decorating and piping can be started. (Secretary, Mrs. B. Coles.)

McLAREN FLAT.

The cooking competition held on 5th August resulted as follows:—Cream cakes—1st, Mrs. G. Hobbs; 2nd, Mrs. C. Oakley; 3rd, Mrs. N. Low. On 2nd September, Mrs. Yeend gave a demonstration of making posies for exhibition. Congress reports were gives by Mesdames Warren, and Nicolls. (Secretary, Mrs. S. Elliott.)

MILLICENT.

Two papers were read at the August meeting, "Elocution" by Mrs. Wiltshire, and "The Aims of the Agricultural Bureau" by Mrs. Redman. On 17th September papers on "Gardening" were contributed by Mrs. M. Redman and Mrs. E. Wiltshire. (Secretary, Miss O. Lear.)

MONARTO SOUTH.

Miss Hein presided over an attendance of 33 members and visitors at the August meeting. A non-competitive exhibition of needlework was staged. (Secretary, Mrs. F. Liebelt.)

MORCHARD.

On 31st August, members of the Willowie Branch took charge of the meeting, and papers were read by Miss F. McCallum and Mrs. Stone. Congress reports were read at the September meeting. (Secretary, Miss B. Twigden.)

MURRAMINGA.

Mrs. J. S. Hunt read a paper, "The Ceduna Bureau Conference" at the meeting held on 3rd July. (Secretary, Mrs. F. Roberts.)

MYPONGA.

A social afternoon with competitions and community singing was held on 19th September. Twenty-two members and visitors attended. (Secretary, Mrs. M. Bounds.)

NARRIDY.

Reports of the delegates who attended the Annual Congress were given at the October meeting. Formal meetings were also held on 9th August, and 4th September. (Secretary, Mrs. H. Siviour.)

NELSHABY.

Mrs. Middleton judged the needlework and thrift articles competition held on 20th May, and the 7th Annual Report was presented by the Secretary, Miss A. Lawrie, on 24th July.

Flowers for Indoor Decoration.

A flower show was held on 23rd September. Miss C. Franks read the following paper: —

Flowers should be picked in the morning, and are best immersed in water up to the flower heads for an hour or so (an enamel bucket is a good thing to put them in). Roses keep longest if they can be arranged in a bowl in this position. Gum tips, especially, are better placed in a bucket of water before they are arranged in vases, because the vases need constant refilling if the leaves are arranged directly into them. Poppies, maiden hair fern, and some kinds of shrubs will wither immediately if the ends of the stems are not singed in a flame—this is better than placing the flowers in hot water.

The water in all flower bowls should be changed often. Generally when arranging flowers each variety looks best with its own kind. Nothing looks nicer with most flowers than their own foliage (those of the bulbous variety seem to look stiff if a few of their own leaves are not arranged with them. When arranging a vase of flowers, they should not be crowded together—each bloom should have its full value.

The floral arrangement for one room should be in one tone of colour, and should harmonise with the colouring of the room. If flowers are used on a meal table they should not be of the heavily perfumed variety, neither should tall vases obstruct the view across a table. At present the flat arrangements, such as floating bowls, are favoured. When flowers are not available pot plants can be used for indoor decoration. This is where a shade house comes in handy, because the plants inside can be changed frequently with those outside. Pot plants become very sickly if left inside for any length of time. Maiden hair fern has a pleasing effect if cut and arranged with many kinds of flowers. Gum leaves are a good standby during summer for those who have not an endless supply of water. A room done out with greenery looks very refreshing on a hot day.

O'LOUGHLIN.

Miss I. Hastings presided at the June meeting when Conference arrangements were discussed, and on 22nd July at Mrs. Kloeden's residence a Biscuit Competition was conducted. A social evening was held on 19th August.

OWEN.

Mr. H. J. Apps (Senior Dairy Adviser) delivered an address "Cheese Making," at the June meeting. Miss G. Harkness won the butter competition. At the July meeting Miss D. McPharlin—the youngest member of the Branch—read a paper on "Knitting." Five members were proposed. Miss E. Wood was awarded first prize for the best knitted article. The Annual Social was held on 8th July, when Mrs. C. L. Marshman was presented with a trophy for gaining the highest points in the Competitions conducted during the year. On 12th August Mrs. W. J. Marshman contributed a paper "Making Marmalade." Congress reports were received on 14th October. (Secretary, Miss A. Harkness.)

PARILLA.

The 6th Annual Cooking and Flower Competitions were held on 22nd April, and the function being opened by Mrs. A. J. A. Koch. The aggregate prize was won by the Secretary, Mrs. R. Welden.

PARILLA WELL.

On 5th May, a homestead meeting was held at Mrs. Thiel's residence. Mrs. M. Davies read a paper "The Uses of Hessian" on 18th May, and on 20th July, a display of gifts made at a cost of not exceeding 2s. was held. (Secretary, Miss A. Billing.)

PARRAKIE.

Twenty-one members were present at the July meeting when a demonstration of Rug Making was given. Sweets Recipes were exchanged at the June meeting, and on 21st July the Annual Combined Dance was held. The Annual Meeting took place on 29th September and Congress reports were discussed.

Gelatine.

Mrs. Threadgold gave numerous recipes and read the following paper at the August meeting:—

Gelatine is simple and quick to use and often solves the problem of what to prepare that is cool and tempting; also economical and at the same time nourishing and easily digested. Left-over foods of all descriptions such as meat, vegetables, fruit and cake can be used and made into the daintiest of dishes by adding gelatine, and the housewife will find it invaluable that these dishes can be prepared at any time and set aside until required. Fruit juices can be used for cake fillings, allowing 1 dstspn. of gelatine dissolved in a little hot water, stirred into 1 cup of juice and then set in a cake tin to fit the cake. Either lemon juice or a pinch of citric acid brings out the full flavour of the ingredients; gelatine has no flavour so add flavourings very carefully. Beetroot in jelly preserves all the delicate flavour of the vegetable and none of its juice is lost for it surrounds the slices and cubes in the form of a jelly. If using ingredients which are light and likely to float—such as slices of fruit and vegetables—add a little of the liquid and when firm pour over some more. Another way is to let the jelly thicken slightly and then pour it over the ingredients. Gelatine is also used in a great variety of home-made sweets. It is also useful as a thickening for soups and gravy.

Mrs. Gravestock spoke on "The Care of Flowers in the Home." (Secretary, Miss L. Beelitz.)

PENOLA.

Mrs. J. O'Connor, who judged the woollen article competition held on 2nd June, awarded first prize to Miss J. Oswald. Miss Skene gave a travel talk on a tour around Australia. Thirty members were present at the July meeting, which took the form of a Butter Competition—the highest number of points in the various classes being won by Miss J. Oswald.

The annual meeting was held on 4th August. A Rug Making Demonstration was given by Mrs. F. Lynn and Miss J. Oswald. Mrs. F. Townsend also demonstrated the making of woollen embroidery.

Gardening.

Interesting gardening talks were given at the September meeting by Mesdames Reschke, Balnaves, Clifford, and Fowler. Mrs. Reschke, of Coonawarra, said:—A beautiful garden is indeed a place of beauty, and there are but few people who do not love a garden full of beautiful flowers. There is something fascinating and interesting in growing plants and flowers and having a lovely garden, but one cannot have it and do the work without learning these three lessons—patience, perseverance, and hard toil. Spring flowering annuals will soon be at their best, and attention to their cultivation now will repay the grower, Iceland Poppies, Pansies, and Violas are fairly gross feeders and liquid manure and moisture will bring them to their best and prolong the flowering period. Spring annuals prefer a sandy loam soil as the roots are fine. If the soil is heavy it should be well broken, adding lime, sand, and well-decayed cow manure. Sweet Peas, give them plenty of water if the weather is at all dry, and occasional liquid manuring after a good watering, light cultivation of the top soil and manure mulch to keep the roots cool, and see that they are tied to the trellis.

Stocks delight in new soil and like Antirrhinums do not grow well where the soil has been well manured. For the summer garden there are many beautiful flowers from which to choose. A bed of Zinnias well grown is charming, there are the tall growing ones—Dahlia flowered and giant doubles to grow in the centre, and then to graduate in size to the small edging ones. Plant Fantasy, then the quilled ones, then the small ones such as Lilliput or Gallardia flowered. These small Zinnias are very beautiful with lovely markings and of many beautiful shades. Mrs. Reschke then gave a list of many other summer flowers and to save time and watering in dry spells advised a top dressing of fine stable manure.

Mrs. W. Balnaves said:—Two of the best summer annuals are Phlox and Petunia, they grow quickly and have a wealth of flowers, if grown for show. Rosy Morn is one of the best, but if a better class of flower is needed Giant Pink Frill and Superbissima are two that are worth a place in any garden. Asters should be planted early, too much manure causes the blooms to go green. Salpiglossis is a very beautiful summer annual, but as they do not like transplanting, they are better sown where they are to bloom. Bonfire Salvia looks best when massed, as the colour is apt to clash with other flowers. Stocks are good summer flowers, and if the seed is sown now they will make a nice show in a short time. Penstemons is a favourite perennial. Delphiniums are much sought after as blue flowers. Dahlias are great favourites in the South-East and will flower from November to May. October is a very good time to plant them, as they are gross feeders and like plenty of manure and water.

Mrs. F. Fowler said:—Flowers are often scarce in winter, and to ensure blooms in this period I suggest growing of Stocks, Violas, Pansies, Primulas, and Iceland Poppies. Plant stocks in Decmeber and they will give beautiful blooms right through winter. The other flowers mentioned may be planted from January to February. Nemesia, winter Sweet Peas and Schizanthus may also then be planted. A combination of Nemesia, Schizanthus, and also Larkspurs, Clarkia, and large double poppy make a most effective combination. An idea for growing sweet peas is to have the trellis made in an inverted L shape like a verandah about 4 or 5ft. in height, the effect is very striking and a rustic seat may be placed in this novel arbour. She also gave a few hints on growing Gerberas—see that the seed is good. The best is procured from Queensland. Plant under glass from September onwards and when large enough put into boxes or pans until sufficiently grown to plant in the open. Choose a sunny position in the garden, as they love the sun: it is important that they have good drainage; a good plan is to gather all rubbish—old clothes, sticks or tins—cover well with soil and you have an ideal bed for Gerberas, they do not require any manure, just natural soil, but good drainage is essential. A good plan when the frosts come is to lift each up with a trowel and place clumps under trees; you may lose a couple of plants during the frost spell, but no more.

Mrs. W. Clifford suggested pot plants, window boxes, and hanging baskets where it was impossible to have a garden. If possible every garden should have a shrub bed. Aside from their beauty in the garden, they make the problem of filling the vases in the home an easy one. A few beautiful flowering shrubs were Single Pink Oleander, Geralton Wax, Flowering Gums, Gardenia, Jacaranda, Magnolia, Flame Tree, Japonica, White and Mauve Lilac, Daphne, Spice Tree, Barberry, and Oratayns. Masses of Daffodils, Jonquils, and snowflakes could be grown under trees or in uncultivated patches. There were many flowers which took little attention for the wonderful qualities of bloom they gave, chief among these were Dahlias, Gladioli, Iris, Marigolds, Phlox, and Petunias. The Mexican Sunflower had a long flowering period, made a good show in the garden, have many beautiful colours. One of the prettiest beds she had seen was grown in front of a built-up verandah, along the back of which was growing a Pink Periennial Pea, among which was planted brightly coloured Sweet Peas. The bed was a mass of Pink and Mauve Antirrhinums interspersed with clumps of Forget-me-not, the front was edged with a small border, the bed was in full bloom at Christmas.

Shrubs and Trees.

Paper presented by Mr. J. B. Adamson:—

The tasteful grouping of shrubs and trees constitutes one of the most effective and enduring features of the garden, as may be seen by a brief study of some of the old homes of the South-East. Shrubs well worth considering are:—Gums—*Calaphilo Rosia* (rose pink), *Alba* (creamy white), Eucalyptus *Ficifolia* (orange scarlet), and has its flowers borne in large bunches. These have dense foliage, and would obscure unsightly beds, &c. In the Banksias everyone knows of the pink Bottle Brush, but why not grow some of the varieties found in our scrub with their deep-green leaves, silver underlined. For a small and exceedingly decorative shrub the Barberry, both flowering and berry, are fine types. The Ceanothers is a handsome shrub with a mass of misty-blue flowers. The Oleanders have many beautiful calours. One of the most important points to remember in planting shrubs is to allow plenty of room. While shrubberies are very young they may be planted with herbacious plants, but after the shrubs have gained a conspicuous size, the ground should be wholly given up to them. A few exceptions to the flowers which should then be removed are lilies and other bulbs, Foxgloves, Tree Dahlias, and Hollyhocks—all of which produce a good effect among shrubs. (Secretary, Miss A. M. Marks.)

PINBONG.

The May meeting was held at Mrs. G. Scholz's residence. Mrs. E. Kammermann read a paper, "Jam and Jelly Making."

On 19th June Mrs. Scholz read the following paper:—

Improvement of Farm Cream and Butter.

Every dairy should be supplied with proper conveniences for cleaning the various utensils. Brushes are much better than cloths, they remove dirt from the corners and can be kept clean more easily. All cans, buckets, and separator should be first washed in tepid water before they are scalded. After washing in tepid water, scrub the can, &c., in hot water with a little soda and then dip them in a large dish of boiling water to scald them properly, then it is not necessary to dry them with a cloth, just place them in a clean, airy place to dry. This method keeps tinware bright, free from germs and rust and does not injure the coating of the tin. Rusty buckets should not be used; they present a rough surface on which milk and cream lodge, is difficult to remove, and they cannot be kept perfectly clean. The contact of cream with anything unclean, whether it be stable air, separator or utensils, affects the quality of the butter. The cow yard should be covered with concrete and slope slightly towards a drain at one side, then it can easily be cleaned.

It is important that the cows are kept clean, dirt adheres to the cows, dries on them and later probably falls into the milk. The cows' udders should also be well washed before milking, otherwise small pieces of dirt or chaff are apt to fall into the milk. Wear clean overalls, kept especially for the purpose and washe regularly. Points to remember are to thoroughly strip the cows; this develops the udder and helps to keep up the milk yield. Milkers should not use milk for moistening the teats. Remove the milk immediately from the shed where it is liable to be contaminated. Then it should be strained by pouring it through a fine metal strainer to remove solid pieces of dirt, and then a fine cloth strainer to remove all dissolved dirt. The cloth must always be sterilised by boiling before use. If the milk is to be used for butter purposes it should be separated while warm and cooled at once. Cleanliness and prompt cooling of the milk and cream are important points in making butter.

Miss P. Hissey gave a demonstration of making silk mats on 17th July. Secretary, Miss D. Scholz.

PINNAROO.

Flower Show.

The annual Flower Show was held on 6th May. The exhibitions staged in all sections were of good quality. A good number attended the fixture, and there were visitors present from Karte, Peebinga and Parilla. This year the entries totalled 187. To encourage the junior members, the Branch adhered to its policy of providing classes for the younger folk. Entries were forthcoming for these. The Hon. M. McIntosh, Commissioner of Crown Lands, opened the Exhibition. At the meeting held on 2nd July Mrs. G. Nicholls read a paper, "The Parafield Poultry Station," and the annual meeting was held on 6th August. The September meeting was devoted to a discussion on "Household Hints," and on 1st October reports of the Congress delegates were read and discussed. (Secretary, Mrs. Wirth.)

RENDELSHAM.

Officers were elected at the July meeting. Mrs. F. Todd spoke on the "Growing of Onions and their Uses," at the August meeting. 1st September was a gift afternoon, the funds of the Branch benefiting to the extent of £1 0s. 3d., as a result. Delegates' reports of the Adelaide Congress were received on 6th October. (Secretary, Mrs. Z. Bignell.)

SADDLEWORTH.

Marmalade recipes were exchanged at the meeting held on 1st June. The Secretary, Miss G. Frost, reported that the Branch, through its efforts, had forwarded £16 11s. to the Flying Sister Fund.

Laundry Work.

Mrs. Garrett read the following paper at the July meeting:—

The most important requisites are plenty of soft water and a good plain soap. There are also some good washing powders on the market, and used accordingly to directions, help to make washing easier. Where the housewife has an electric machine the work should not be strenuous, but as the majority of women in the country are not privileged to have an electric washer, they should have the necessary conveniences, copper, machine, wringer, troughs, or tubs to make washing as easy as possible. Before beginning to wash, sort the clothes. Woollens, silks, or any coloured articles which are likely to fade should be washed separately, rinsed and hung out right away. Soiled handkerchiefs are easily washed after letting them stand in cold salt water overnight, rinse next morning and wash in the ordinary way. If a machine is used put clothes in warm soapy water (not hot). soaping and rubbing collars and cuffs of shirts and blouses or any other stains, let soak a little while, add hot water, then wash. If the water becomes very soiled, take fresh, otherwise the clothes will be dingy. All wearing apparel should be turned inside out and put in the copper to boil (but do not have the water boiling). As soon as the clothes boil well, remove them to the sudsing water. If they boil too long they are likely to become yellow. Let each article be well "soused" in the sudsing water, wring and put into rinsing water which should be blued. After wringing out of blue water starch all articles necessary, shake well and hang out as soon as possible.

Wringers are now part of the regular washing apparatus; skilfully used they are an effective washing machine. If they break off buttons it is the fault of the laundress. The clothes should be folded with buttons inside, and thus pass through the wringer. When hanging out, be sure to stretch every inch possible to the sun and wind. Garments hung double or in bunches will not bleach. Hang coloured articles in the shade if possible, as the sun is likely to draw out the colour. See that the pegs are kept clean and dry, and the line wiped before the clothes are hung upon it. The iron should be scrupulously clean; always wiped before putting away and kept in a dry place. If the starch sticks to the flatiron, take a piece of beeswax or paraffin wax, put between two sheets of paper, rub the warm flatiron over it, wipe and proceed with ironing. For starch, take 1oz. of the best starch, add enough cold water to make a smooth paste, then add 1 pt. boiling water, stirring well. For washing woollens, Lux, Persil, or Rinso are very good used as directed, also for blankets. To whiten scorched linen it is often sufficient to wet it with soap suds and place in the hot sun.

The Annual Meeting was held on 3rd August and on 7th September Miss Frost gave a display of needlework.

SHEOAK LOG.

Mrs. Richardson addressed the June meeting on "Women's Place in the Home." On 18th July, Messrs. Gray and Eden spoke on Kangaroo Island. Officers were also elected. The Branch has now 48 financial members. The Annual Social was held on 18th August. Members visited the S.A. Farmers' Union Factory at Mile End on 2nd September, and reports of the Adelaide Congress were received at the October meeting. (Secretary, Miss K. Koch.)

SNOWTOWN.

The Branch held a social afternoon on 15th June and the annual meeting took place on 1st July. Mrs. J. W. Stanton read the following paper at the July meeting:—

Rearing Turkey Chicks.

In the breeding of turkeys one must attach a good deal of thought in selecting the very best stock procurable. The male should be a large, healthy, clean-looking bird in every respect, his legs should be fairly thick and smooth, with no sign of scaly leg. He should not be less than 12 months old and a year older is an advantage. Select as mates for him, up to a dozen second season hens, on no account breed from pullets. These should also be the best and largest of the earliest chicks and be chosen before any are sent to market, because they will be the ones to lay earliest the following year, which is an advantage on account of green feed. Turkey hens often hide their nests; they must be watched very closely lest a fox should pick up their eggs and the turkey. If the hen hides her nest, it should be found and all eggs picked up as they are laid. Have a coop ready in which to set the hen when she becomes broody. Turkey hens are easily managed in this way; give the hen 16 to 18 eggs (this depends on the size of the hen—a large hen can cover 18 eggs successfully). If these are placed in a shallow hole in the ground with very little chaff or straw under her and the coop darkened with rags hung over it, the turkey hen will rarely fail to set on the nest. She sets from 28-30 days—if she lays and sets in a suitable position, where she is not likely to be disturbed—so much the better, she can be left there and can go off for food and exercise when necessary. If in a coop she must be fed and have plenty of clean water to drink. If the nest is not in a position to receive moisture from rain, the eggs should have a light sprinkling of water about once a week, and also on the 28th day if they are not showing signs of hatching. The hen should not be disturbed while hatching, otherwise she becomes distressed and may squash a chick or two before it is properly out of the shell.

After the chicks have been hatched about 48 hours, they may be moved to a larger coop where they can be fed. The hen will also need food, as she eats very little while setting. She does not feed her young as well as the fowl hen does, she is inclined to eat it all herself and starve the chicks. To avoid this, have a hole where the chicks may go into another small coop for their feed, or a box where food may be left for the chicks without fear of the mother eating it all. There must be plenty of clean water in *shallow* tins for the chicks. Their feed should consist of plenty of finely cut greens—this is very essential in the successful rearing of turkey chicks—almost any greens, such as lucerne, wire weed, grass, lettuce leaves, thistles, &c., may be used. If any of these are not procurable, as it sometimes happens in summer, finely chopped onion is an excellent substitute and a good tonic. Any of these may be mixed with bran and a little pollard and moistened with curds. Keep broods in separate coops until they are quite strong and do not expose to cold, wet weather until they are well feathered and then not more than can be avoided. The idea of keeping them in separate coops is because the mothers will often fight and trample on the chicks. If they can be hatched while there is plenty of grass, or if they have access to a lucerne patch, they will soon pick their own green feed. A wise precaution is to make a mixture of lard and kerosene—about 5ozs. of lard to 1 of kerosene. Mix this well and smear under the wings and on the featherless places on the bodies of the chicks. This prevents lice and tick troubling them.

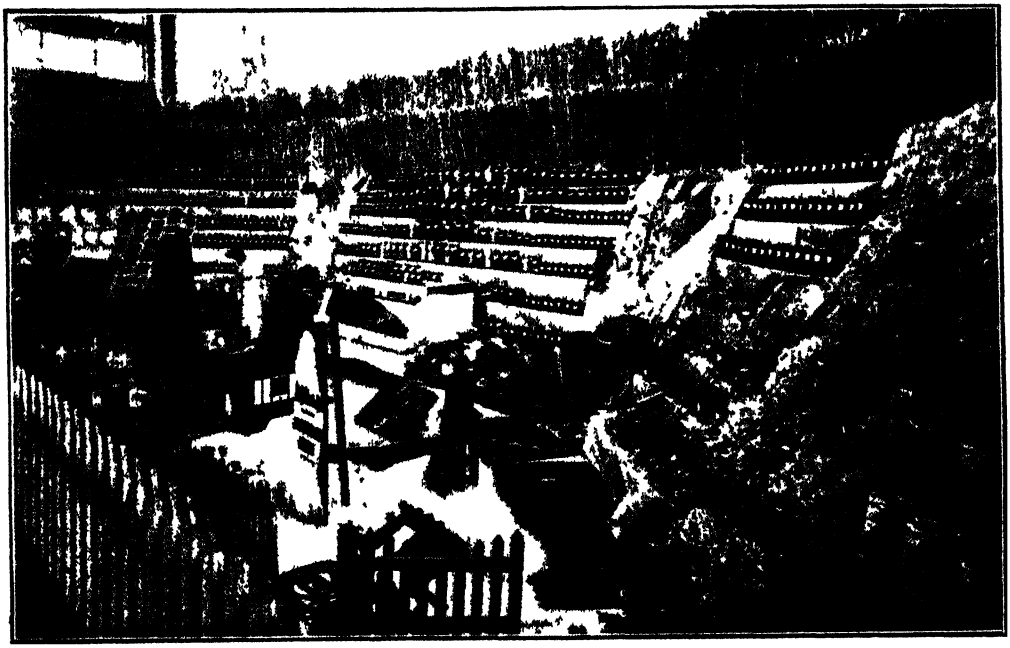


Exhibit of the Strathalbyn Branch at the Royal Show.

Mrs. Hocking read a paper, "Raising and Rearing Chickens." On 7th October Mrs. W. J. Spafford addressed an attendance of 38 members and visitors at Mrs. P. Wheaton's residence on "A Trip to Port Darwin." (Secretary, Mrs. W. Jenkins.)

STRATHALBYN.

Thirty-eight members and visitors attended the May meeting, when Mrs. Wyatt gave a Rug Making Demonstration. Mrs. J. Collett read a paper on "The Potato" at the June meeting, and officers were elected for 1937-38. "Recipes for the Evening Meal" was the subject discussed on 8th July, and on 2nd September members gave considerable attention to the staging of the Bureau exhibit at the Royal Show. Congress reports were read on 7th October. (Secretary, Mrs. C. Hudd.)

TANTANOOLA.

Yeast Baking.

Mrs. J. P. Buchard read the following paper at the May meeting:—

Dietary studies show that because of a lack of knowledge of the nutritious value of foods, whole families are often underfed. They can over-eat and still suffer from malnutrition. True economy in the purchase and preparation of foodstuffs is the art of obtaining the highest value in food for the money expended. A liberal use of dried fruits, raisins, currants, or sultanas in yeast cakes or buns helps to supply the energy required for mental and physical work, and combined with a plentiful supply of butter, both a nourishing and healthful food is easily provided for a large family. The following are a few of the most popular recipes that I use:—

Raisin Bread.—2 sifters flour, 1 dspn. salt, 3 or 4ozs. sugar, 1 cup each warm milk and warm water, 1 large tbspn. lard or butter, 1lb. seeded raisins, 1 cup of yeast. Method: Sift and warm flour, make hole in middle, add yeast, a little of the sugar and warm water and make a batter in a little of the flour. Cover and stand in warm place for 15 minutes. Then add raisins, remainder of sugar, lard, water, and milk, and mix into dough. Knead well and cover and stand until it doubles its size. Mould into loaves and set to rise again in a warm place. Bake in a hot oven. When cooked, glaze with sugar and water syrup.

Chelsea Buns.—Sift together 1 sifter flour, pinch of salt, and 2 level tpns. cinnamon, 3ozs. of castor sugar, 3 ozs. butter melted in ¾ cup of lukewarm milk, 1 egg, well beaten, about ½ cup yeast. Knead to a smooth dough. Cover and stand to rise in a warm place. When dough is ready, turn on to a floured board, knead lightly and divide into 2 portions. Roll each piece into an oblong shape. Melt ½oz. butter and brush over the rolled out dough. Sprinkle liberally with currants and dredge with castor sugar. Roll up like a roly-poly and cut each piece into about 8 or 9 pieces and place on a slightly greased and floured tin. Stand aside in warm place to rise again before putting in a hot oven to bake. When cooked, brush with 1 tbspn. milk and 1 dtsn. castor sugar and return to oven to dry glaze. Cool on sieve.

German Coffee Cake and Buns.—2 sifters of flour, 1 cup each sultanas and sugar, pinch of salt and nutmeg. Warm in oven, then make a hole in centre of flour and added 1 cup of yeast, 4 beaten eggs, essence of lemon, 2 large tbspns. dripping melted in sufficient milk to mix into dough. Knead well and stand in warm place to rise to about twice its size. *For Buns.*—Make into balls and place on slide to rise again. Bake in fairly quick oven and glaze with sugar and water on removing from oven. *For Cake.*—Spread dough evenly on slide about an inch in thickness and set aside to rise again. Before putting in oven brush with melted butter and cream and sprinkle thickly with top mixture. *Top for Cake.*—Roll in hands until crumbly, butter, flour and sugar with a little grated nutmeg.

"Sponge Making" was the subject of a paper read by Miss M. Rycroft on 2nd June. The annual election of officers took place on 7th July; Mrs. W. Stafford being appointed Secretary. A pruning demonstration was given by Mr. A. L. Warren, of the Department of Agriculture, on 4th August, and on 1st September each member brought a recipe and a sample of the cake, &c., made from it. Mrs. Pycroft read a paper, "Cream Puffs," at the October meeting.

WIRRABARA.

Forty-five members and visitors attended the May meeting when Dr. Last spoke on "Prevention of Diseases."

Meatless Meals.

WHOLEMEAL.

Mrs. Keynes read the following paper at the June meeting:—

If wholemeal bread is not generally used, this should be the first step, being careful not to make the mistake of buying bread that is coloured brown, and a small percentage of wheatmeal or bran added. The bread should contain from 75 to 90 per cent. pure wheatmeal. It can be easily made at home, using ¾lb. white flour made into a sponge; when it has risen mix into

3 times the amount warmed wholemeal flour, knead very thoroughly and place in warm tins; when double the size, bake, keep everything warm so that there is no check in the rising. Scones are a good substitute, using white flour and wheatmeal in the same proportions as in the bread. Wheatmeal biscuits can also be used. Again the same proportions of white flour and wholemeal, with cream of tartar and soda, and a little butter and mixed with milk or water. Also the flour can be mixed with thin cream. A nourishing biscuit:—2 cups wheatmeal, 1 of white flour, 2ozs. butter, 1 tspn. cream of tartar, ½ tspn. carbonate of soda, mix with 3 well-beaten eggs. A little sugar can be added, or only salt. These, with the whole grain biscuits on the market, can keep the housewife so well supplied that there is no need to fall back on white bread.

More and more people are making a breakfast of fruit alone. When people wish to have a mixed breakfast of fruit and bread, it is wise—unless the person has a very strong digestion—to have the fruit first. There is no better breakfast for the growing child in the cooler months than wheatmeal porridge, eaten with honey and cream. Out-back people who, during the depression, were forced by necessity into grinding their own wheat, must have noted the improved health of their households. They were able to build up a resistance to disease denied the people in towns on rations, which contained white bread, jam, and meat. Breakfast is the meal that has seen the most drastic reforms, especially women with their indoor life find that it takes hours to get over what has always been known as a "good breakfast."

VEGETABLES AND FRUIT.

These should form 75 per cent. of the food intake, and whenever possible should be eaten uncooked. The free use of salads purifies the blood and restores tone to the system. Fortunately, tomatoes are within the reach of most for many months in the year, and where other salad vegetables are not easily obtained, a housewife should make an effort to grow a few salad vegetables in summer. A small bed of lettuces, thinned out as needed, makes quite a passable salad; garden cress and radishes for garnishing, and a little chopped mint varies the flavour. It is a good plan to put any growing onions in the ground, and give some water—the green tops provide another flavouring. Nothing brings out the flavours of tomatoes so much as a little garlic rubbed on the knife used in cutting. They are improved by the addition of a little sugar, especially late in the season. Cabbage, which takes 5 hours to digest when cooked, takes 2½ when eaten raw. Cut very finely it can scarcely be distinguished from lettuce. It is good mixed with diced celery or raw grated carrot, or both. Turnips and red beet grated and daintily arranged on lettuce leaves are often used. Water melon cut in cubes with grated onion and sprinkled with pepper and salt, and a very little vinegar and water, or lemon juice, is delicious to those who like onions. Start the family on the salad habit now, and they will come through the winter and spring without the colds they so often get, or the colds will be more easily shaken off.

COOKING.

When cooking vegetables, conserve their value by steaming, grating or cutting small; a piece of butter in the saucepan and a little water and grated carrots, parsnips, or turnips will be cooked in 10 minutes or less, drain any liquid for soup or gravy. A mixture of melted butter and lemon juice poured over cauliflowers is an improvement on the sauce usually served. Potatoes should be baked in their skins whenever possible. Scrub well rinse and dry, and place in a fairly hot oven. Medium ones take about ¾ of an hour. When soft to the touch, make a split in each, squeeze a little, and place a little salt and butter on the cut. Cookery books say that onions, turnips, and carrots—the latter wrapped in grease-proof paper—can be baked in the same way.

SOUPS.

Soups, if served at a meal made with split peas, lentils, and beans, are all that is necessary of protein at a meal. One lb. makes about 3 quarts of soup. Recipes for these soups abound in every cookery book. Tonic vegetable broth, made from any vegetable in season and using the odds and ends, resulting when vegetables are being prepared for cooking or salads; well-washed green pea pods, turnip tops which contain valuable salts, potato peelings, peel and seeds of vegetable marrow, trimmings from French beans and celery; use sparingly of cabbage and cauliflower. This broth is a better tonic than can be bought in shops, and nobody suffering from kidney, rheumatic, and allied ailments can but benefit by drinking it as freely as they like. It can be the basis of all vegetarian soups and gravies.

For the protein part of the meal, the food which takes the place of meat in the menu, use nuts or cheese, or dishes which contain them; also split peas, the various dried beans and lentils. These should be soaked overnight and cooked for 2 hours—the beans take much longer. They can be eaten as they are, flavoured with butter, pepper or salt, or onions or celery parsley, or they can be made the basis of the many dishes, the recipes of which can be found in any good vegetarian cookery book.

RECIPES.

Cottage Cheese, often recommended to be eaten with salads, is easily made:—Take 1 quart fresh milk and stir into it 2 tblspns. of lemon juice, then beat slowly until it separates; do not boil. Hang it up in a cheese cloth until dry. Mix with salt and chopped parsley. A little cream may be added.

Rice and Cheese Savoury.—Slice and cook 2 onions in 1 tblspn. of butter. When brown, add 1 pint water and ½lb. of unpolished rice. When cooked, add ¼lb. cheese grated, and 1 dstspn. chopped parsley.

Vegetarian Sausages.—Half cup each Lima beans, kidney beans, and boiled unpolished rice, 1 large onion, 1 tspn. each mixed spice, mixed herbs, and chopped parsley; ½ breakfast cup brown bread crumbs, 1 egg. Soak beans for 12 hours. Next day cook in enough water to cover, adding more if needed, for 2 hours with the onion. Strain and mash. add the cooked rice, bread crumbs, spice (if liked), herbs, and parsley. A little pepper and salt. Mix, form into sausages, roll in flour, fry in butter. Serve with brown gravy.

Nutmeat Roast.—One cup each cooked split peas, ground almonds, whole wheat meal flour, 2ozs. butter rubbed in the flour; parsley, thyme, celery, salt to taste, 1 grated onion, grated carrot. Mix with 1½ cups of cold water to the consistency of cake, and bake about 1½ hours until a golden brown.

Vegetarian Cornish Pasties.—Make a short pastry by rubbing 4 tblspns. butter into ¾lb. of wheatmeal flour, and mixing with the yolk of 1 egg; a little lemon juice and enough cold water. Have ready enough carrots, potatoes, parsnips, and onions, and 2 sticks of celery minced and cooked, season and let cool. Cut the pastry into squares, put 2 tblspns. of mixture on each, pinch edges together. Brush with egg and bake in quick oven.

Mrs. Francis read a paper, "Jams and Jellies," at the July meeting, and on 19th August, Mrs. Harding spoke on "First Aid," and Mrs. Phillis gave a demonstration of the treatment of simple fractures. Congress reports were discussed at the September meeting. (Secretary, Mrs. E. Harding.)

Termites, or White Ants—Their Activities and Methods of Extermination.

[Mrs. C. D. McCarthy, B.Sc. (Milang).]

There are few parts of South Australia in which some species of white ant is not found, either in the soil or in wooden structures in the vicinity. The southern portion of the State appears to have numbers of these insects, and consequently it is of special interest to people who live hereabout to learn of their habits and their various modes of living. Many people have had the misfortune to find a floor or some other structure eaten by these pests, and it is usually hard to get rid of them without going to a fair amount of trouble and expense. A great deal of research has been done of late years in order to find the best methods of extermination.

LIFE HISTORY.

The ants always form colonies, which are amazingly well organised, and never in any way haphazard. Each individual has its definite place in society, and is so specialised that it could not exist away from the other members of the colony. A colony consists of three types of individual;—

Firstly, the worker, whose duty is is to forage for food and convey that food to the other members of the colony. These workers have soft bodies and heads, and they are equipped with powerful jaws to enable them to bit through the wood which is their entire food. This method of attack on the wood leads to the formation of passages of more or less irregular outline running through the wood. After a time the whole wooden structure being attacked becomes riddled with these passages, and the wood left rapidly decays. The workers are blind and cannot stand bright light for any length of time; consequently these build tunnels from the nest to the wood they are attacking at the time.

The second type is the soldier class. These "ants" live only to protect the colony from invasion, and although their bodies are as soft as those of the workers, they have a much more formidable head. They either have very powerful jaws or have secretory glands capable of producing a substance which is offensive to any insects which might attack the colony. Their mode of defence—and it is always defence, as they stay either in the nest or in the covered tunnels and passages—is to advance their heads, which are hard and able to resist attack, out of the hole which has been made by the invaders and try to bite or repel the enemy. The remaining type is that composed of males and females, both of which are equipped with wings at mating time. These insects are not strong fliers, and very soon lose their wings. They do not mate until they leave the parent colony, and after they have lost their wings a pair will crawl under a piece of wood or into a crack in the soil according to the species to which they belong, and there the eggs are laid and a new colony soon starts. Certain species are night fliers. They frequently become a nuisance. as they lose their wings and crawl all over the place. It is extraordinary that no attack on the timbers of any house has been started by these insects entering in the winged stage. Mating usually occurs in summer, but some Northern Australian species leave the parent colony in winter.

The nest made by the two insects houses the nursery, and is inhabited by all three types of individual. Its structure varies greatly. Certain species form their nests in the wood they attack, while others nest in the soil and build covered tunnels to the source of food supply. Some of the nests in the soil are just a concentrated series of passages and the all important nursery, but many species build mounds. These are especially typical of types in Northern Australia, where huge mounds are built, and these are gradually enlarged as the colony grows in size. The nursery in these mounds is at the centre and of relatively small size. It contains the king and queen and the young Termites. Another type of nest is built in the fork of a tree, and from this type tunnels are constructed along the trunk to the ground to enable the workers to go foraging. The number of insects in a colony varies a good deal, but it has been estimated that in the case of a certain mound-building species, the nest may contain 2,000,000 or more individuals.

Termites have no burial place, but eat their dead. The knowledge of this leads to the success of certain methods of extermination. They also have a habit of stroking one another with their mouths and thus any particles of poison adhering to the body are swallowed and cause death. That white ants do a great deal of damage is well known, and any method of control, which is in any way successful, is of value. When building any wooden structure it is well to bear in mind that certain timbers are much more resistant to attack than others.. For example—Jarrah is a hard close-grained wood which, although not absolutely impervious to attack, is shunned by Termites. Red Pine is very resistant. The wood of the Native Fir (*callitris*) contains volatile oils which appear to be distasteful to termites.

There are certain Termites which live on growing timber. These attack trees and shrubs vigorously and usually lead to the total destruction of the plant in time. These "ants" cannot attack seasoned wood, probably because of the water content being considerably less. The species which attacks seasoned wood, however, does not seem to be so sensitive to variation in water content and will attack wet or dry wood.

Still, it is certain that wood in contact with, or buried in the ground, is especially open to attack, although it is unusual to find wood attacked much more than a foot below the soil surface It is advisable to take care that all communication between soil and timber is cut off when wood is of the type easily attacked by the insects.

CONTROL.

There are several methods of prevention of attack on wooden buildings. The use of durable hardwoods for piles in the soil is one. The placing of sheet metal shields upon these piles is an added precaution. The shields prevent the insects from passing through the timber above. One type of shield takes the form of a metal cap which projects at least 2in. beyond the edges of the pile. These edges of metal should be directed downwards. The placing of a metal strip around the inside of masonry or concrete is used to stop the inroads of Termites. This should be firmly embedded in the masonry and should protrude 2in.

Termites do not like working in a well-ventilated locality, so the better the ventilation the less likely the attack. The treatment of the piles in the soil with creosote oil is a method of attack widely and successfully used. All nests in the vicinity should be destroyed wherever it is possible. Even when this is done it is often found that the colony continues to live. This, it may be thought, is impossible if the king and queen are destroyed, but that is not so, as there exist in the colony a number of reproductive forms which are normally in a state of arrested development. These may, in the event of the destruction of the king and queen, continue development and become fully matured adults with the power of producing new individuals of all types.

The damage done to wood is very characteristic. The galleries formed follow the tracts of softer material in the structure. Thus, the wood formed in autumn, which is much harder, owing to the greater formation of a substance known as lignin, is attacked less than spring wood with its much wider and more sappy wood vessels.

Numerous methods of destruction of Termites have been tried. Some people use Carbon bisulphide, benzol, or hydrocyanic acid vapours. A pump is used to introduce the poisonous gases into holes drilled into the nest for the purpose. These holes are sealed immediately after the gases are administered. Calcium cyanide is usually used as the source of hydrocyanic acid. This is a bluish powder which gives off the gas when in contact with moisture. In the case of a mound building Termite (*Eutermes exitosus*), success has been obtained by drilling a hole into the nest and blowing white arsenic or paris green into the centre of the nest. The dust gets on to the bodies of the Termites and is passed on to other members of the colony and gradually the whole community dies out.

So many do not suspect the presence of "white ants" until they are fairly well established, and it becomes necessary to treat timber already infested. Of late years, success has been gained by the use of poison dusts which are blown into the main passages in the attacked wood. A fine tube is inserted and the dust blown in with the aid of a rubber bulb. The galleries are then sealed in such a way as to disturb the Termites as little as possible. The dust is picked upon the bodies of the insects and distributed to others. It has not yet been ascertained whether this method will destroy whole colonies. Arsenical poisons should not be used in buildings, as it is a rather dangerous proceeding. Sodium fluosilicate is relatively non-poisonous to human beings and is therefore more suitable for the purpose.

A method used lately with good results consists of the pumping of hot fumes from a mixture of sulphur and white arsenic. The machine used consists of a furnace connected to an air pump. On to a charcoal fire in the furnace a mixture of 3 parts of arsenic to 1 part of flowers of sulphur is thrown. It is necessary to find one of the main passages from the infested wood to the nest. This is opened and the fumes are pumped into the opening for 15 to 20 minutes. The opening is then sealed with clay. By this method a badly infested house can be treated to arrest the inroads of the "white ants."

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All communications to be addressed:

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A. P. BLESING, *Minister of Agriculture*

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Agricultural Shows

We have been advised by Secretaries of Agricultural Show Societies that their shows will be held on the following dates:—

Mundalla, Wednesday, 9th March, 1938.
Mount Pleasant, Thursday, 17th March, 1938.

Overseas Wheat Quotations

By courtesy of the New South Wales Marketing Bureau, the South Australian Department of Agriculture is supplied regularly with statements showing overseas quotations for wheat to the nearest eighth of a penny. The accompanying table gives weekly quotations in London, the State or country of origin of the wheat, and months of shipment or delivery.

Date of Quotation.	London Values.								
	S. Aus. Wheat.	W. Aus. Wheat.	Manitoba No. 3 Wheat, ex Atlantic Ports.	Argentine Wheat.	Karachi Choice White Wheat.	American Hard Winter Wheat.	White North Pacific Wheat.	Russian.	
1937.	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.	
Nov. 18..	Nov. 5 2⅝	Nov. 5 1⅞	Dec. 5 9⅜	Jan.-Feb. 5 6¼	—	Nov. 4 11¼	Nov.-Dec. 4 10⅛	4 10½	Karachi Choice White.—Unquoted—Russian quote, afloat.
Nov. 25..	Nov. 5 0	Nov. 4 11¼	Dec. 5 5⅞	Jan.-Feb. 5 3⅛		Nov. 4 9⅝	Nov. 4 6¾	4 6	Karachi Choice White.—Unquoted—Russian quote, afloat.
Dec. 2....	4 10⅞	Jan. 4 9¾	Dec. 5 6¾	Jan.-Feb. 5 2⅞	—	Dec. 4 10⅞	Dec. 4 8¼	4 5¼	Karachi Choice White.—Unquoted—Russian and South Australian quotes, afloat
Dec. 9..	4 9	4 8¼	5 8⅞	5 3⅞	—	4 11¼	4 6	4 4½	Karachi Choice White.—Unquoted—Russian and South Australian quotes, afloat 7,500 tons (March shipment) from all Australian ports sold at 4s. 7½d.

THE JOURNAL

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Department of Agriculture

OF

South Australia

Vol. XLI. DECEMBER, 1937. No. 5

Progressive Centennial Development of the Pastoral and Agricultural Industries of South Australia, 1836—1936

[By Arthur J. Perkins, O.B.E., Life Member of the Advisory Board of Agriculture and of the Agricultural Bureau, Chairman of the Governing Council of the Roseworthy Agricultural College, sometime Director of Agriculture (1914-1936), Principal Roseworthy Agricultural College (1904-1914), &c.]

(*Continued from Page* 325).

THE FIRST DECADE, 1836-1846.

CHAPTER IX. (continued).

The Mount Barker Special Survey—Early Reputation of the Land—Opinions of Hawdon and Sturt—Stevenson's Exultation—Dutton settles Contingent of German Refugees at Mount Barker—McLaren takes up Special Survey at Lyndoch Valley for South Australian Company—His attempt to Secure Priority of Choice at Mount Barker over Dutton foiled by the Governor—Correspondence on the Subject—The Lyndoch Valley Special Survey—McLaren's Pride in its Choice—Suggested Farming Contract with Robert Robertson—Abortive Hay Contract with George Duthy—Farming Lease of one-half of Lyndoch Survey to Cooke and Browne—The Sources of the Angas Special Survey—The Three Brothers' Special Survey—Matthew Smillie's Special Survey—The Meadows Special Survey—The Para Rivers Special Survey—The Milner Estate Special Survey—Stephen selects Special Survey Originally Recommended by Captain Sturt to David McLaren—Libel Action Against Publisher of the "Southern Australian"—G. M. Stephen Stands his Trial for Perjury—Libel Action against Proprietor of "Register" leads to Stephen's departure from South Australia.

On the 14th January, 1839, David McLaren claimed for the South Australian Company the *second* Special Survey to be granted in the Province, namely, the *Lyndoch Valley Special Survey*: to this end and conformably to "a Special Order of the Board of Colonization Commissioners, dated 22nd January, 1836", he deposited with the Colonial Treasurer, thirty Preliminary Land Orders—corresponding to the purchase money of 4,020 acres of land, and demanded the survey of a "compact district not exceeding 15,000 acres" in area, "to the northward of Adelaide," and "known by the name of Lyndoch Valley and its neighbourhood" (34) from which subsequently to the survey he proposed selecting 4,020 acres for his Company. On Map No. 1* acompanying this volume, the Lyndoch Valley Special Survey had been given "29" as its distinguishing number.

The following topographical details should make clear the location of this Special Survey, together with its approximate boundaries. The western boundary line ran almost due north and south, with the township of Lyndoch situated about one-half a mile to the west of it. Both north and south boundary lines were almost at right angles to the western one, with Williamstown about one mile to the south-west of the south-western angle of the Survey, and Mount Crawford about two miles to the south of the centre of the southern boundary line. The North Para River entered the Special Survey by way of its western boundary, at about one and a half miles from the north-west angle, flowing towards the centre of the Survey at Rowland's Flat, and issuing therefrom close to its north-eastern angle. The eastern boundary was irregular in outline, with Jacob's Creek crossing it about two and a half miles north of the south-eastern angle, and thereafter flowing more or less parallel to the eastern boundary, but about half a mile to the west of the latter.

McLaren had shown from the outset particular partiality for the Lyndoch Valley Survey, and for quite understandable human reasons: for him, no more than a layman in the matter, it commemorated the first exhilirating experience of successful land speculation on a large scale: but from his viewpoint better still perhaps, it was his own personal selection, after successive rejections of sites recommended to him respectively by Sturt and Light, both of them admitted experts in the matter. In February, 1840, the Lyndoch Valley Survey was at last in the process of being *surveyed,* and at that time McLaren wrote that it was "the only Special Survey taken by" him "in which there" was "not an abundance of water in pools and streams . . . but the appearance of the soil was such as to leave no doubt that water would be got by digging a few feet down," and this indeed had at the time been "ascertained to be the case. The Surveyors" had dug "beside their tents a well eight feet deep in which there" was "from two to three feet of water" . . . he had "every reason to believe that the same general result" would "be found in other places of that Survey, which for fertility of soil . . . was not to be surpassed . . . in the colony." (35) Robert Robertson, an experienced Scotch farmer, had told McLaren that in his opinion Lyndoch Valley alone would for many years to come more than suffice for the production of corn required for home consumption in the Province: and in this opinion William Randell had concurred, although himself averring that its soil was not equal to that of the "Sources of the Onkaparinga" (36): and to the latter view even McLaren eventually veered. "As an agricultural district" he wrote at a later date, Lyndoch Valley "was highly valuable," but "the soil" was "not quite equal to a great proportion of" the Company's lands. It was "the worst watered Special Survey" that he had taken "but being in a great measure unencumbered with trees" it was "ready for the plough" from the outset. (37)

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(34) *South Australian Gazette and Colonial Register*: 19th January, 1839, page 1, col. 3, and 25th January, 1839 page 2, col. 1. See also David McLaren to George Hall, 15th January, 1839, and George Hall to Edward Stephens, 18th January, 1839.

(35) David McLaren to Edmund J. Wheeler, 25th February, 1840.

(36) David McLaren to Edmund J. Wheeler, 14th November, 1839.

* Map No. 1 referred to in various parts of the article in this issue was published in February, 1937.

In August, 1840,—*i.e.*, more than nineteen months after the right to Special Survey had been officially granted—McLaren was able to report home that the Survey of Lyndoch Valley had been completed, and that he proposed going thither at an early date to select the Company's 4,020 acres therefrom, and to make arrangements for a lease the terms of which had already been agreed upon with William R. Cooke and Dr. William James Browne. (38)

Dr. William James Browne (1815-1894), Pastoralist.

[*Plate* 59.]

It should be stated here that McLaren had already made several abortive attempts to secure some pecuniary advantage from the natural fertility of Lyndoch Valley, indeed even before he had any legal title thereto. In November, 1839—*i.e.*, about ten months before the completion of the survey—he announced to his London correspondent that he had "almost arranged with Mr. Robert Robertson, who had come out as one of" the Company's "farm tenants to commence operations on" the Company's "account at Lyndoch Valley. He" was "thoroughly acquainted with the East Lothian system of farming—he will adopt it there." (Not without appropriate modifications, for his sake and the sake of the Company, it was devoutly to be hoped). "Owing to his want of capital" the Company "must furnish all the means—or nearly all—but he" was "content to risk all he had to risk—*his time and labour*—and to take his ultimate remuneration by a share of the profits, after paying a rent of 10s. per annum, wages to others and 15 per cent. per annum on all Capital expended." (Surely a somewhat stiff proposition, especially as between brither Scots?) McLaren was "very much disposed to make the attempt, to encourage the cultivation of the soil, to ascertain the capabilities of that district, to increase" the Province's "rural population, and" in the event of success which he never doubted, he had "every reason" according to Mr. Robertson, "to expect a great influx by and by of East Lothian farmers—a most desirable class of men for South Australia." (39) These views, be it noted represented a considerable advance on McLaren's earlier impressions as to the probable prospects of farming in South Australia. "Unless I am very much mistaken," he wrote in June, 1838, "it will be a considerable time before any farmer in this Colony can grow corn so as to compete with imported corn: and small capitalists who come out on farming and devote their attention to the cultivation of the soil, and raising crops of wheat, barley, or oats, will, I am persuaded, make their small capital smaller." (40) But as nothing further had been vouchsafed to us as to the Robertson proposals—which in effect were contrived to furnish McLaren and the Company with that local agricultural experience, which they obviously lacked; not at their own expense, however, but at that of the freshly debarked emigrant, wise in Scottish farming lore, but unacquainted as yet with Colonial pitfalls—we must presume that these proposals had met with the fate they deserved and passed on into oblivion. (41)

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(37) David McLaren to Edmund J. Wheeler, 17th July, 1840.
(38) David McLaren to Edmund J. Wheeler, 29th August, 1840.
(39) David McLaren to Edmund J. Wheeler, 14th November, 1839.
(40) David McLaren to Edmund J. Wheeler, 7th June, 1838.

The next attempt, although less ambitious, was equally abortive, at all events from the Company's standpoint. "I have concluded an arrangement" wrote McLaren "with a Mr. George Duthy for liberty to cut 500 acres of grass in Lyndoch Valley at 12s. 6d. per acre to be paid in hay, deliverable in town at £5 per ton. If he implement his engagement it will be well for us" (Yes!) "and I believe well for him" (?) "as the crop is very abundant and the price likely to be very high. Not having got any legal title to the land I may experience some difficulty (42): but I mention this arrangement as proof of my anxiety to make the most of your property at the earliest possible time"—it was not yet their property—"and as an indication of its probable value." (43) All that could be said of this proposed transaction, apart from its probable illegality, was that if by some mischance the unfortunate Duthy should have made a gallant attempt "to implement his engagement" he would probably in due course have had ample occasion bitterly to ask himself into whose hands had he fallen? By this same engagement he was required to cut, dry, stack, and cart to town in diminutive bullock drays, over 25 miles of rough bush tracks, the loose grass hay scattered unevenly over some 500 acres of virgin land—the mean yield from which over its whole area, notwithstanding McLaren's estimate of "abundance," would probably not have exceeded half a ton to the acre, however favourable the season. But apart from the unavoidable costs of getting—probably with scythes—curing, stacking, and carting the hay, Duthy was required by the terms of his agreement to pay 12s. 6d. per acre to the South Australian Company for grass that it had neither cultivated nor sown—*i.e.*, £312 10s. for 500 acres. But worse still—as the astute McLaren had no doubt foreseen—this payment was not to be made in cash, but in kind, namely, in hay delivered in Adelaide, and valued at £5 per ton at the point of delivery. An examination of contemporary records showed, on the other hand, that at no time between November, 1839, and April 1840, inclusively,—*i.e.*, a period of six consecutive months—did the price of hay delivered in Adelaide vary from £18 per ton, but falling to £13 in May. Hence it followed that assuming delivery of the hay to take place within this period of six months—upon which McLaren would certainly have insisted—Duthy, should he have been foolish enough "to implement his engagement" would have had to pay the equivalent of £1,125 instead of the modest £312 10s. apparently contemplated by his agreement: and well might McLaren have said that in such circumstances "it would be well for us!" But Duthy apparently made no such attempt, having probably in the meanwhile ascertained that he could not do so with any particular advantage to himself: and in support of this surmise we find McLaren complaining later on that the Company had "got nothing yet from the persons who" had "agreed to pay for the liberty to cut the grass" in the Lyndoch Survey. (44) It was obvious therefore that even in those days there was such a thing as over-reaching oneself in business transactions.

The proposed arrangements with Cooke and Browne, on the other hand, were conceived—perhaps as the result of past experience—in a far more liberal spirit: and they could be accepted as *fair* to both parties to the contract; and as such were likely to succeed. The only question of moment that might perhaps be raised was whether virtually to dispose of one half of a valuable

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(41) David McLaren to Edmund J. Wheeler 12th August, 1840. McLaren wrote later that "the proposed scheme of assisting Robertson to commence farming operations in Lyndoch Valley was abandoned."

(42) This was not McLaren's first attempt to secure direct pecuniary gain from land to which the Company had no legal claim, whence his anticipation of difficulties in the Duthy hay transaction. See Appendix XI. at back of volume.

(43) David McLaren to Edmund J. Wheeler, 20th November, 1839.

(44) David McLaren to Edmund J. Wheeler, 28th February, 1840.

Special Survey on terms involving a right of purchase upon a liberal fixed basis, was altogether in the best interests of the Company thus early in the history of the Province. The only possible reply to such a question would be that knowing McLaren as we had learnt to do, however much we might be inclined to question his dealings with those opposing or even merely doing business with the Company, his devotion to the latter's interest was too well established for us to hold it one moment in doubt—"I have only one rule: the best means of promoting the interests of the Company" (45)—"Mr. Fisher and others know that when the interests of the South Australian Company are concerned I *know* no man" (46)—"I shall do no more than I stipulated, namely, an opportunity of investing my savings so as not to interfere with *the religious consecration of my whole time to the service of the Company.*" (47) And McLaren's astuteness and business acumen were such that it was highly improbable that he should have been led astray in so important a matter: in the circumstances we shall conclude that just as McLaren in an earlier transaction had vainly hoped that all would be well with the Company, so now we could assume that all was well indeed with the Company in the transaction under consideration.

The arrangements with Cooke and Browne were outlined by McLaren somewhat as follows:—"I have completed an arrangement with Messrs. W. R. Cooke and William James Browne for a lease of one half of the Lyndoch Valley Special Survey. The terms are fixed, the papers are in the hands of Messrs. Bartley & Gwynne and the following are the principal points."

"The lease is certain for seven years of at least 2,000 acres. Rent: First year, 4s. per acre; second year, 4s. 6d.; third year, 5s.: fourth, fifth, sixth, and seventh years, 6s. per acre: with liberty of renewal on their part for seven years more at 8s. 6d.: and for seven years more at 9s. 6d. each year."

"They are to have a month after possession is given to determine whether or not they will take over an absolute lease for twenty-one years. If they engage to do so, 1s. per acre annually is to be deducted for the last fourteen years. making 7s. 6d. and 8s. 6d."

"They are to have a right of purchase of 1,000 acres, or 2,000, or the whole during the first seven years. If 1,000 (acres) be bought the price to be £6; if 2,000, five guineas; if 4,020, four guineas per acre: with the privilege of one year after obtaining possession to determine whether they will absolutely engage to make a purchase during the first seven years. If they so decide, the price is to be respectively—£5, £4 10s., and £3 10s. The payment in the event of a purchase to be thus:—One-third of the amount in three equal instalments by Bills at three months, fifteen months, and twenty-four months: the first two not bearing interest, the last to include interest for two years at 10 per cent. per annum. The remaining two-thirds of the purchase price to be mortgaged on the property at 10 per cent. for ten years certain if required by them, but may be paid off at any time they please. . . ."

"Mr. Browne will immediately employ a considerable capital improving and stocking" the land, "and if they do not lease more than 2,000 acres they will greatly enhance the value" of the Special Survey: "and supposing it wholly sold, the Company will receive for what cost originally £2,412 in 1835, £14,070, of which we have reason to believe that £4,690 will be duly paid as above, and that 4s. 8d. per acre per annum . . . will thereafter be obtained till the balance of the purchase money be paid. This is the least that can be received under the present arrangement, an arrangement which I have every reason to believe will be faithfully implemented, and issue in a purchase of 2,000 acres." (48)

(45) David McLaren to Edmund J. Wheeler, 23rd August, 1837.
(46) David McLaren to Edmund J. Wheeler, 11th June, 1838.
(47) David McLaren to Edmund J. Wheeler, 27th May, 1839.
(48) David McLaren to Edmund J. Wheeler, 17th July, 1840.

After the selection of 4,020 acres for the Company in this Special Survey, there would still remain, according to McLaren, "1,200 additional acres of excellent land," the greater proportion of which he proposed taking up for the Company in exchange for the future Port Lincoln Special Survey, which as we shall see in the sequel he found himself obliged to surrender. (49)

The *third* Special Survey—4,000 acres from a compact district of 15,000—was granted on the 16th January, 1839, to John Barton Hack who had been dispossessed of his famous Cattle "Squatting" Station by W. H. Dutton. Hack's Survey was described as lying "to the northward of Adelaide," and "known as the *Sources of the Para River*" (50): on Map No. 1 attached to this volume this Survey had been given "4" as distinguishing number. This Survey was more or less triangular in outline, including towards its southern apex Millbrook and Chain of Ponds: Kersbrook was just outside the centre of its eastern boundary, and Golden Grove came within three miles of the centre of the western boundary: while the northern boundary adjoined Sampson's Flat. According to McLaren "Messrs. J. B. & S. Hack intend selling or leasing their portion of the Special Survey at the Sources of the Para in small farms, at £4 for purchase or 12s. per acre yearly rental."

The *fourth* Special Survey was hurriedly taken up by McLaren for the South Australian Company on the 24th January, 1839, after he had been compelled by Governor Gawler to surrender his alleged claim to land that had been taken up by W. H. Dutton. This Survey had been described as 4,000 acres—subsequently increased to 9,000—out of a compact district of 15,000 acres, "known as the Sources of the Angas River"—but actually the Onkaparinga—and lying "to the northward of the Joint Stock Cattle Company's Station." (51) On Map No. 1 this Survey had been given "6 and 7" as distinguishing numbers. This Survey was roughly L-shaped abutting to the south upon Dutton's Special Survey, with Forest Range lying about one mile from the centre of the western boundary; and the townships of Woodside, Charleston, and Lobethal distributed over its eastern half.

The *fifth* Special Survey was allotted to J. B. Hack on the 23rd January, 1839—4,000 acres out of 15,000—known as "The Three Brothers" to the southward of the Survey chosen by W. H. Dutton. (52) On Map No. 1 the Survey had received "10" as distinguishing number. To the north it was bounded by Dutton's Survey, and included portion of the "Squatting" Station of the Joint Stock Cattle Company; whilst Echunga lay roughly towards its centre.

The *sixth* Special Survey was ostensibly taken up by Matthew Smillie: actually however the latter had agreed to share the Survey with the South Australian Company. "One" Special Survey, wrote David McLaren, "in the same neighbourhood in the name of Matthew Smillie, lately arriving from Leith, of which I have one half for the Company, and am to have first choice"—as was to be expected—"which will enable me to connect it with the Company's other Survey there"—*i.e.*, Nos. 6 and 7 of the Map. (53) This Survey was granted on the 24th January, 1839, and was simply described as 4,000 acres—subsequently increased to 5,000—from a district of 15,000 acres "to the northward of Mount Barker (but not to interfere with any other Survey in the Mount Barker District)." (54) On Map No. 1 this Survey had been given "8" as

(49) David McLaren to Edmund J. Wheeler 11th November, 1840.

(50) *South Australian Gazette and Colonial Register*, 26th January, 1839, page 2, col. 1.

(51) *South Australian Gazette and Colonial Register*, 26th January, 1839, page 2, col. 1.

(52) *South Australian Gazette and Colonial Register*, 26th January, 1839, page 2, col. 1.

(53) David McLaren to Edmund J. Wheeler, 26th January, 1839.

(54) *South Australian Gazette and Colonial Register*, 26th January, 1839, page 2, col. 1

distinguishing number. Its southern boundary abutted upon the northern one of W. H. Dutton's Survey; and its northern boundary upon the southern one of the South Australian Company's Survey "No. 6." The townships of Balhannah and Oakbank lay along its western boundary.

Charles Flaxman (1806-1869), G. F. Angas's Agent in charge of German emigrants. [Plate 60.]

The *seventh* Special Survey was taken up by Charles Flaxman, on the 31st January, 1839, namely, 4,000 acres out of 15,000 "to be called the *Meadows*, and lying to the south and south-west, and if required to the west also of the district of the Three Brothers." (55) On Map No. 1 this Survey was given "11" as distinguishing number. The township of Meadows was towards the centre of the Survey: its northern boundary abutted upon the southern boundary of "The Three Brothers": the western boundary traversed Dashwood's Gulley: and Bull's Creek came within half a mile of the southern third of the western boundary.

On whose behalf Flaxman had secured this Survey, it was at the time difficult to say: as would be seen in the sequel he operated pretty freely and heavily in Special Surveys, and it was not thought at that time that he could have done so at his own charges. He had come out to South Australia in the *Prince George* on 18th November, 1838. He had been placed in charge of German Emigrants sent out to Australia under the auspices of G. F. Angas & Co., and was reputed to be G. F. Angas' personal agent: hence it was generally assumed that Flaxman's purchases of land had been made on Angas' behalf, even McLaren accepting this view: but for what reason all such purchases should without exception have been registered in Flaxman's name did not appear at that time to have been anybody's business to ascertain.

The *eighth* Special Survey was allotted to Henry Dundas Murray and John Reid on the 31st January, 1839, namely, 4,000 acres in a district of 15,000 acres "on the junction of the North and South Para Rivers, distant about 25 miles north by east from Adelaide." (56) This Survey had been given "2" as distinguishing number on Map No. 1: it was more or less rectangular in shape—5½ miles by 4 miles—with Gawler Town at its centre.

Henry Dundas Murray, Pastoralist. [Plate 61.]

With the *ninth* Special Survey we come to one that acquired considerable notoriety at the time, and gave rise to much heartburning in high places, and upon which we shall have to dwell at greater length. It was allotted to the Honourable George Milner Stephen—Colonial Secretary and former Acting-Governor pending the arrival of Governor Gawler—on the 20th February, 1839, namely 4,000 acres in a district of 15,000 acres "on the banks of the Gawler River, commonly called the North Para, and from the outlet of a salt water creek, or close to the outlet of that river, about twenty miles to the north-west

(55) *South Australian Gazette and Colonial Register*, 22nd March, 1839, page 3, col. 4.

(56) *South Australian Gazette and Colonial Register*, 22nd March, 1839, page 3, col. 4.

of Adelaide." (56) Appropriately enough the Special Survey of the Colonial Secretary and ex-Acting-Governor was given "1" as its distinguishing number on Map No. 1. For a "compact district" as provided for in the Land Regulations this district was wonderfully elongated, being two miles wide from the sea beach inwards, and bisected by eleven miles of river, the water frontages of which had been purloined on either bank, much to the future disadvantage of settlers located a mile or so away from the river. The Survey included the townships of Port Gawler, Milner, Buckland Park, and Lewiston: in due course it became known to all and sundry as the "*Milner Estate.*"

Stephen who was "a gentleman that loved to hear himself talk" had left us a very pretty account of an arduous voyage of discovery, or rather of re-discovery of an ideal site for a Special Survey—the future Milner Estate, in fact: the preamble we fear, must be taken for granted, that we may the better concentrate on the discovery. "Here commenced" wrote the ex-Acting-Governor, "beautiful alluvial banks on either side, running out from one hundred yards to three-quarters of a mile, adorned with the most magnificent red and other gum trees that I have met within the three colonies. The same rich alluvial soil to the depth of 30 to 50 feet, as we thought by the opposite banks, with a succession of ponds, continued for about seven miles, when the Gawler ended in an extensive flat of many hundreds of acres, studded with immense trees, and in which also we have been informed there is water; and to which indeed, we saw a path made by the aborigines. About one quarter to half a mile from that spot, we came upon a salt water creek, flowing into the gulf and which His Excellency has permitted me to name '*Strange's Creek*' after my attendant who led us to it, and had discovered it about two years ago in a boat, when a fisherman."

"I should mention that at about three miles from the outlet of the Gawler, Strange recognised the spot as the place to which he had accompanied Captain Sturt last year; and which the latter had described to the South Australian Company and strongly recommended for a Special Survey; but which the Manager did not inspect, or it would not have been my good fortune to possess it."

"We were tired, and therefore did not proceed far up the salt water inlet, being satisfied that large boats could discharge cargo upon the alluvial flat itself, but at all events upon dry land, and trusting to Strange's description of its entrance and short course from the gulf. That description is abundantly confirmed by the written report of Captain Sturt to the Company . . . Strange informed us that the creek so abounds with fish, that to use his own graphic description 'the boat actually laid upon their backs' and his last haul in it, before he became a landsman amounted to 99 dozen, which he sold to other fishermen at Port Adelaide for £13 odd!" Obviously the fisherman-temperament had shown no signs of change in the progress of years.

"Upon my return to town I took a Special Survey in this spot from the mouth of the inlet up the bank of the Gawler as far as the water extends. I would rather give the opinion of a practical man upon its value and capabilities, by mentioning that Mr. Strangways (57) has offered me £10 per acre *for any part of it.* That offer I have declined at present, being anxious before any sale to take the opinion of the most competent gentlemen in the Province as to the site which should be laid out for a town, and which must become one of

(57) T. B. Strangways together with W. Nation had accompanied Stephen on his voyage of re-discovery.

great importance—possessing as it does an easy access to the sea, and a level road for land carriage, less then twenty miles from Adelaide, to which I rode in three hours. I have merely to add that as soon as the spot has been well surveyed by sea and land, it is my intention to lay out a town for sale." (58)

And in this manner were skilfully laid the first germs of that "puffery" of Milner Estate, which was to give grievous offence to those less skilled in the art, and eventually to the withdrawal in disgrace from the Province of one who had occupied its highest office: but let us see how McLaren took the bait.

"It may be proper," he wrote, "for me to refer to a Special Survey taken some time ago by Mr. G. M. Stephen, Colonial Secretary, and called by him the 'Milner Estate,' including Port Gawler and the stream of the Gawler. This estate he has puffed in the newspapers and otherwise to nausea. In his first statement he mentioned it as having been pointed out to me by Captain Sturt, but neglected. It is the country pointed out by Captain Sturt to me, or rather to Mr. Edward Stephens by description, &c. I never saw Captain Sturt in regard to it, he had gone to Sydney ere I returned at that time from Kingscote. Before going out with Colonel Light, Mr. Finniss and Mr. Samuel Stephens, Captain Sturt's sketch of the country and description was submitted to their consideration, and they were unanimously of opinion that the river which he described was the Para. Under this impression, when the party was out I requested Mr. Finniss and Mr. Randell to ride across the country so as to strike upon the Para considerably below the pass where we intended to bivouac for the night; and on their return they concurred in assuring me that it was very poor land, utterly unsuitable for a Special Survey; and expressed great surprise that Captain Sturt should have recommended it. It is supposed that he had done so from having seen it when the grass was green, and from his being very near-sighted, so that without the aid of spectacles he cannot see many yards from him. This view of the matter was supposed to be confirmed by the circumstance of the northern channel (on which the New Port is intended to be established) being seen by Mr. Finniss and Mr. Randell in the direction of the Para, so that Mr. Finniss concluded without hesitation or doubt that the creek described by Captain Sturt was the northern channel. My want of knowledge of the country, my inexperience as an explorer, and my confidence in Colonel Light, Messrs. Finniss and Stephens in that department led me to believe, without the idea of any mistake occurring that *that* was the district which Captain Sturt had recommended, but that it was altogether unsuitable for a Special Survey. It was however not the district:" but "that which Mr. G. M. Stephen saw" was the district and "he had some difficulty in finding it, as he stated in his first public letters. I was grieved to find I had missed it after having paid Captain Sturt handsomely for his trouble in the matter, but I have faithfully stated the circumstances. The incessant "puffing" of that property by Mr. Stephen is disgusting. The countenance given by him to the report, if not the fabrication of the report, that one half of the Survey has been sold for £20,000, which some say then reduced to £10,000, and is now said to be £5,000, is most disreputable to the Honourable the Colonial Secretary and the present Acting-Governor."

"In the *Southern Australian* newspaper of the 8th instant, it is stated as 'upon authority that no such sale or pretended sale had been effected, and that the whole story was therefore a gross and abominable hoax upon the public.' I have not been on the ground," but "believe that the Survey contains some very excellent land. He has been allowed to extend the Survey much further above the river than seems to correspond with the term *'a compact district.'* It is questionable whether the proposed site of the town of Port Gawler will not be under water during winter: but still it is a matter of deep regret I had not the opportunity of examining it; in which case I doubt not I should have taken a Special Survey there for the Company." (59)

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(58) *South Australian Gazette and Colonial Register*, 2nd March, 1839, page 8, col. 1..

We had there a frank and unvarnished statement "faithfully" recorded, including an unqualified admission of error and an expression of regret therefor: and one would have imagined that it would have satisfied any Board of Directors, particularly coming as it did, from a Manager of McLaren's recognized competence and devotedness to his employers' interests; and also in view of the fact that the Special Surveys subsequently secured for the Company were on the whole undoubtedly superior in value to the Milner Estate. But no: for this was the comment with which McLaren was favoured some twelve months later: "The Board note your explanation of Mr. G. M. Stephen getting the Survey of the Milner Estate, which would appear from your own showing to be 'an advantageous investment. The occurrence will convince you of the impropriety of taking things for granted, and of the importance of using your own judgment and investigation beside the opinions of others. Being done, it cannot be undone; but it is mortifying to pay for knowledge and then to allow others to reap the benefit." (60) Poor harassed McLaren; berated like a truant schoolboy and condescendingly supplied with elementary rules as to the business way of using his intellect and senses. It almost seemed as if the London correspondent—Edmund J. Wheeler—was taking advantage of the occasion to retaliate upon McLaren the latter's not infrequent criticisms of the mistakes of the London Office.

Returning to the proprietor of the now notorious Milner Estate it can be said briefly that he took legal proceedings against the printer and publisher of the *Southern Australian*—Archibald MacDougall—for alleged libel in statements concerning the Milner Estate. In the latter connection, when Stephen had succeeded in his suit the Editor of the *Southern Australian*—Charles Mann—stated that arbitrary and imperfect as was the law of libel, there were two methods of proceeding under it, one by which facts would be elicited, another by which they might be suppressed. An individual seeking and hoping to clear his character from aspersion would, as a matter of course, choose the former the prosecutor in the late instance had chosen the latter. (61)

It appeared that due to certain facts that had been elicited during the course of the Stephen-MacDougall Libel Trial, the Governor had ordered a departmental enquiry into Stephen's doings: this enquiry was however suspended so soon as it became know that Stephen had been placed under bail to come before the Supreme Court at its next sitting to answer a charge of *wilful and corrupt perjury* to be preferred against him by Archibald MacDougall. (62) The cause of this was that at the trial Stephen had brazenly denied upon oath that he had ever said that he had sold one-half of the Milner Estate for £20,000, whereas, unfortunately for him, documentary evidence to that effect was known to be in existence. (63) "The legal proceedings of Mr. G. M. Stephens," wrote McLaren, "against the publisher and proprietor of the *Southern Australian* newspaper are over, a verdict of "guilty" obtained and I think justly obtained, but from the proceedings it is quite evident that means not the most *honourable* have been adopted to induce purchasers of the Milner Estate at extravagant rates; while up to this date no *bona fide* sales to any extent have been effected; and charges of a much more serious nature are publicly said about to be preferred against Mr. George M. Stephen founded on his depositions in Court." (64) In the meanwhile several citizens of weight—and among them John Morphett, David McLaren (65) and George Stevenson (66)—declined to continue acting as Justices of the Peace so long as G. M. Stephen remained Chairman of the Magistrates.

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(59) David McLaren to Edmund J. Wheeler, 11th May, 1839.
(60) Edmund J. Wheeler to David McLaren, 5th November, 1839.
(61) *Southern Australian*, 22nd May, 1839, page 3, col. 2.
(62) *South Australian Gazette and Colonial Register*, 8th June, 1839, page 1, col. 1.
(63) *South Australian Gazette and Colonial Register*, 15th June, 1839, page 3, col. 4. See also Appendix XIII. at back of volume.

The perjury case ended in a judge-imposed verdict of "Not Guilty" mainly on a legal technicality, and much to the horror of McLaren, and, no doubt, of other lay minds of his way of thinking. "Yesterday," he wrote, "the Grand Jury unanimously returned a true bill against Mr. G. M. Stephen for wilful and corrupt perjury, although the Judge instructed them that a legal objection lay against their doing so. On that Jury were Messrs. J. B. Hack, Kingston, Field, Cock, and others,—most upright men. Mr. Hack has since told me that he had *not a doubt* of the perjury having been committed. To-day the case went to trial, the Judge retaining and expressing the same opinion. Mr. G. M. Stephen expressed his wish that the Judge would not urge merely legal objections," but "the Judge adhering to his rule, Mr. Mann who conducted the prosecution, abandoned three of the six points, adduced some evidence as to some of the others, but was very much fettered by the Judge. At last the Jury informed the Judge that they wished to be released as evidence was prevented" from "being adduced, and a number of the common people audibly expressed their approbation. One man was taken into custody for doing so. Mr. Mann gave up the whole case: the Judge charged the Jury, took upon himself the whole responsibility of the mode in which the trial had been conducted," and "told the Jury that they must return a verdict of 'Not Guilty.' The Jury without retiring began to consult; incidentally the Judge told them they had nothing to consult about; the foreman informed His Honor that there were some of them who had doubts, when the Judge rose and said:—'Gentlemen of the Jury are dismissed' and the Court broke up, at least I and many others came away. The above is a plain, full, and true account of what I witnessed. I was present only about twenty minutes, or at most half an hour. It is mournful indeed but true, and if the Governor and the other officials shall continue to countenance and support Mr. G. M. Stephen they will be deserted by the whole body of Colonists." (67)

It seemed only fair that His Honor the Judge—Charles Cooper—who had presided over this abortive trial should be given an opportunity to justify his actions in the matter: and accordingly, to the extent that it had come down to us, the

His Honor Charles Cooper (1795-1887), the second Judge in South Australia.
[Plate 62.] (*Courtesy Archives.*)

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(64) David McLaren to Edmund J. Wheeler 1st June, 1839.
(65) David McLaren to Edmund J. Wheeler, 7th June, 1839.
(66) *South Australian Gazette and Colonial Register*, 8th June, 1839, page 1, col. 1.
(67) David McLaren to Edmund J. Wheeler, 18th July, 1839.

Judge's closing address to the Jury had been given in full in Appendix XII. (68) Briefly, however, and in non-technical language it could be stated that the learned Judge had decided that the crucial proof of perjury, upon which the prosecution had mainly depended, namely, a letter allegedly written by G. M. Stephen to George Stevenson, Editor of the *South Australian Gazette and Colonial Register,* in which the former was said to have requested the latter to mention in his paper that one-half of the Milner Estate had been sold for £20,000—could not be accepted as evidence of perjury in another trial, seeing that it had been admitted that the defender had not been confronted with that particular piece of evidence at the earlier trial: and it followed that since the defendant could not in the circumstances be put upon his defence the case of the prosecution must necessarily fail. Whether such a decision was legally sound or not, must be left to the judgment of those trained in the law: to the lay mind, nevertheless, its immediate effect appeared to have been the acquittal of a man who had obviously been guilty of perjury.

But the early juridical history of the Milner Estate Special Survey had not yet come quite to its close: early in September of the same year G. M. Stephen—goaded thereto, it was believed, by Governor Gawler—brought an action for defamation of character against Robert Thomas, Publisher and Part-Proprietor of the *South Australian Gazette and Colonial Register,* a paper that until that time had loyally supported Stephen in his upward struggle to notoriety in the Province. This Trial which brought about G. M. Stephen's final downfall and eventual departure from South Australia, was in many respects a remarkable one: it extended over five days; the foreman of the Jury, George Hall, Private Secretary to the Governor, and by long association a personal friend of G. M. Stephen had been sub-poenaed by the latter as a witness; and finally the Governor himself appeared in the witness box to give evidence in favour of Stephen. Apparently, too, the famous letter which Judge Cooper had arbitrarily rejected as unacceptable evidence in the preceding trial became the main contributor to Stephen's downfall in the second libel case. Stephen who had elected to conduct his own case, affirmed on oath that in the note he had forwarded to Stevenson he, Stephen, had written that he had sold one-half of the Milner Estate for £10,000, and that Stevenson had subsequently deliberately changed the sum total to £20,000 by substituting a "2" for an initial "1". "Soon after the delivery of the verdict," said the *Register,* "it was understood that the Jury had not thought it necessary to go through the mass of parole and documentary evidence submitted to them, inasmuch as *it was apparent from the original note itself that the sum had been first written* £20,000 *and not* £10,000. This fact so important and conclusive was stated to His Honor this morning in Court by Mr. Hall, the foreman of the Jury: and the question, removed from all surrounding and supporting circumstances, is now set at rest for ever." (69)

"We may now take our leave of Mr. Stephen" said Charles Mann in the closing paragraph of a long article on the famous libel trial. "We do so by strongly advising him to leave the Colony. Here he can do no good: but as he is young, by removing to some other place, and bearing in mind the lesson he had received here, he may recover his character; and as he has abilities and interests he may even rise again to high estate in society: but let him remember that "Pride cometh before a fall." (70) This advice Stephen apparently took, leaving the Province shortly afterwards, but returning several years later to practise as a barrister in the South Australian Courts. In due course the Milner Estate, or at all events the Buckland Park portion of it, passed into the hands of Dr. John Harris Browne, younger brother to Dr. William James Browne, who as we had seen partnered W. B. Cooke in a farming venture on the South Australian Company's Lyndoch Special Survey.

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(68) See Appendix XII. at the back of volume: summing up of Judge Charles Cooper in the trial of G. M. Stephen for perjury.

(69) *South Australian Register,* 7th September, 1839 (supplement), page 2, col. 3.

(70) *Southern Australian,* 11th September, 1839, page 3, col. 1.

APPENDIX XI.

HOW DAVID McLAREN WAS UNABLE TO EXACT RENT FROM LAND TO WHICH HE HAD NO LEGAL TITLE.

Early in 1838, the Directors of the South Australian Company, were sending out to South Australia tenant-farmers, with definite agreements, drawn up in England and including a Right to Purchase Clause over the Company's land. McLaren criticised the terms of these agreements very bitterly, arguing from his knowledge of local conditions that the terms were very unfavourable to the Company, and that details of that character should be left to the decision of the Colonial Manager and his officers. "I beg to state" he wrote "that Mr. Morphett asks, or means to ask, 15s. to 25s. per acre of annual rent for some of his land near town, reserving the timber as well as the minerals, and will not give a longer lease than five, or at most seven years. You have engaged to take 30s. per acre as the price of the fee simple, right of pasturage, &c., Alas! Alas! . . . On what principle the rates were fixed I cannot imagine. It could not be with any reference to the current rate of interest here, and the redemption clause is still more singular. The estimate you have made of the advantage of preliminary choices has been very small indeed. I have no doubt that I could sell any of our choices on the Map at £400 to £600."—*i.e.*, for 134-acre sections, or £3 to £4 10s. per acre—"and now we must give them away at £200—*i.e.*, at £1 10s. per acre. (¹) In a subsequent letter McLaren proceeded to show how much better results could be obtained in the Colony, when the arrangements were left to the judgment of the Company's Colonial Officers: "I have leased a portion of land in 'C' District, called the Horseshoe, from the peculiar bend of the River there, say about 120 acres, for one year at 10s. per acre. Whatever improvements the tenant makes on the land we reap the advantage of in the event of the lease not being renewed: for whatever permanent buildings he erects with our sanction he is to be paid according to the judgment of two arbiters, if he shall leave a year hence. The situation is a choice one on the way to Encounter Bay, can be fenced in owing to the form of the land at little expense: but when the term of one year is considered, that the ground has to be broken up, that it is *twenty miles* from the town, and the lease to begin on the first proximo"—June—"it will explain to you the uncertainty which attaches to the granting of leases in England, and how false a criterion is mere distance from town." (²) Twelve months later, when announcing to his Directors, the result of recent selections of country lands in District "C" McLaren stated: "By the first choice I will secure the Horseshoe Section, a peninsula almost surrounded by the Onkaparinga within a few miles of its connection with the Gulf of St. Vincent and which Section is very likely to be the seat of a village or town. It is half way to Encounter Bay. It was this Section that I let nearly twelve months ago at 10s. per acre, but which rent the person *refused to pay as I had not got the grant of the land.* He has since left it." (³) In other words, McLaren, at the time was no more than a "Squatter" at the Horseshoe and no

(¹) David McLaren to Edmund J. Wheeler, 18th May, 1838.

(²) David McLaren to Edmund J. Wheeler, 22nd May 1838.

(³) David McLaren to Edmund J. Wheeler, 3rd May, 1838.

better entitled to receive rent from the land in question than the man to whom he had professed to lease it. Nor was the London Board, whom McLaren had mercilessly criticised for its home-made leases, slow to take advantage of his candid admission of error. "The failure of the high-rented lease of the Horseshoe Section," wrote its London Manager, "shows that things may be overdone, and the Board would wish your efforts to secure them good tenants at *reasonable* rents for their property, and seeing that no rent is occasionally in arrears. Try to place upon different portions of our 20,000 to 30,000 acres hard working industrious farmers; to obtain substantial tenants of some of our lots at Adelaide, the Port, Kingscote, Glenelg, Port Lincoln, &c., &c., on building leases; to dispose of small portions of our town and country lands to persons who will retain and improve them, &c., and so lay the foundations for secondary towns; to get our flocks and herds in the best order, and to bring their management and supervision into the most efficient; to wind up all outstanding accounts; to clear off all arrears of every kind; and in short to place the Company's affairs in the most flourishing condition. These things deserve your utmost study, and by postponing further extensive outlay, and thus working and employing the capital already paid up, all parties will be better prepared to a further extension of our business." (4) It was much to be feared that the excellent, if trite advice conveyed in this homily must have been so much gall and wormwood to the haughty though religiously inclined spirit of David McLaren.

APPENDIX XII.

SUMMING UP OF JUDGE CHARLES COOPER IN THE TRIAL FOR PERJURY OF G. M. STEPHEN.

"The crime of perjury, as well as every other crime with which any person is charged must be made out to the satisfaction of the Judge in point of law before a verdict can be returned. The law lays down certain rules by which a Judge must proceed, and by these rules I find it my duty to proceed in every case brought before me. If I deviate from these rules I violate my duty—therefore, whatever the opinion of persons unacquainted with the law may be, with respect to the evidence on which a person may be convicted, I say that a person can only be convicted of a crime on such evidence as the law admits and sanctions. Mr. Stephen you heard, requested me not to put a stop to the present case on account of any mere legal quibble; but this I felt it my duty not to comply with. This is not the first time that evidence has been brought before a Jury, which being held by the Judge, as not being consistent with the law of evidence, has been, on that account, the occasion of the case having broke down. I have heard one of the most learned Judges in England, on the trial of a case where proper, and what would be considered lawful evidence was wanting, and where the defendant wished the case to proceed, say that he could not allow it to do so. I now follow the same course, and in so doing, I am willing to take the whole responsibility on myself. In charging the Grand Jury yesterday, I told them what I considered to be the law in regard to *Perjury;* but I also told them it would not be necessary for them to enter so minutely into the points of law as it would be for me when the case came into Court, and that in respect to these points, I should take the responsibility on myself. I have done so. I was unwilling to prevent the case being carried on to-day, if it was to be stopped on merely technical grounds. This I was inclined to do, not only because I wished to let the law have its course, and that was therefore the most proper plan to adopt, but because being the only Judge in the Province I was unwilling to take more responsibility on myself than I really ought to do. But, when I see evidence brought forward which, were I to admit, would be contrary to all rules of justice I would be unworthy to fill the situation I hold, were I to admit it. Whatever may be the opinion of other persons with regard to my conduct—whether they think that I have a bias in this case—I care not, for I have only acted in accordance with those rules of law, which I ought as a Judge, to adhere to. Where would be the use of a Judge unless it were to point out the law?—I have stated my grounds for not allowing Mr. Mann (⁵) to bring forward the evidence he wished to bring, seeing that by that evidence whatever amount of moral guilt might be proved, Mr. Stephen could not be convicted of Perjury."

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(4) Edmund J. Wheeler to David McLaren, 14th October, 1839.

The Judge then went over the different parts of the indictment, and went on to say:—"With respect to the first point of the indictment it is averred that *Mr. Stephen did authorise the insertion of the article regarding the sale of the Milner Estate in the South Australian Gazette and Colonial Register.* With respect to this *the letter or document which Mr. Mann wished to bring forward as proving this authority, it ought to have been produced at the former trial, and shown to Mr. Stephen, and he ought then to have been asked whether he wrote the letter, before it can be brought forward as evidence to convict him of Perjury.* This is the law in this respect; and this letter not having been produced at the former trial cannot now be brought as evidence. The second charge of the indictment is entirely in the same situation, proof of perjury being still attempted to be founded on this letter. The third charge is too general and has not been attempted to be proved. On the fourth, fifth, and sixth charges no evidence has been adduced either, Mr. Mann having given up the case. The only proof then has been on the first and second charges—whether the Article was inserted at the request of Mr. Stephen." With regard to this His Honor stated his former opinion that the evidence now attempted to be brought against Mr. Stephen ought to have been brought forward on the former trial. Such being the state of the case, and Mr. Stephen not having been put on his defence, the Jury, of course, would return a verdict of "NOT GUILTY." (⁶)

APPENDIX XIII.

GEORGE MILNER STEPHEN TO GEORGE STEVENSON. AUSTRALIA.

The letter which Judge Cooper rejected as legally inadmissible as evidence in a Perjury case, but which nevertheless in a subsequent case led to the complete discomfiture of George Milner Stephen was expressed as follows:—

GEORGE MILNER STEPHEN TO GEORGE STEVENSON.

(Confidential). Friday night.

My dear Sir,

"You may announce, if you please (as it will be to the general satisfaction of the "Milner" proprietors) that I have sold to Captain Allen, of the E.I. Service, and Mr. Ellis, also from India, passengers by the *Buckingham*, half the Milner Estate for £20,000! They are in conjunction with myself, going to lay out some thousands of pounds on the town of Milner, by erecting houses, a saw mill, &c., and are going to carry on agriculture to a great extent forthwith.

Bentham has sold nearly a fourth of the town in three days!

There is no news that I can give you but this intelligence will do something towards the advancement of the Province at home."

Prior to the trial of McDougall for libel Stephen made several attempts to get possession of what he probably thought was the only evidence of the "puffing" with which he had been publicly charged—namely, the letter given

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(⁵) The Counsel for the Prosecution.

(⁶) *South Australian Gazette and Colonial Register,* 20th July, 1839, page 5, col. 3.

above. Stevenson however declined to give it up to him as requested; but gave instead a copy of it to the Advocate-General, who immediately handed it to Mr. Stephen. But it was not a copy of the note Mr. Stephen wanted and he accordingly wrote to Stevenson three days before the McDougall trial, *i.e.*, on the 24th May, 1839, again asking for the note he had written concerning the Milner Estate as he wished to show it to Captain Sturt and another friend and take their advice on the subject. But Stevenson again declined to send the original but offered to submit it for inspection if so required. Subsequently Stevenson declined to place the original in Stephen's hands unless he were supplied by the latter with a certified copy. "Mr. Stephen finding he could in no other manner get hold of the note consented to this. A copy was written by Mr. Stevenson, and compared with the original by Mr. Stephen, and *a certificate that it was a TRUE copy of the original as it stood at that moment, written by Mr. Stephen,* placed in Mr. Stevenson's hands, while Mr. Stephen departed with the original in his possession. In the certified copy the figures of £20,000 are as distinctly written as they stood in the original. Mr. Stephen now went to work: he took the original note to the Governor, and within half an hour or an hour exhibited it to His Excellency *with the figures altered!* Having accomplished this feat, Mr. Stephen of course thought himself secure against the consequences. That he had sadly miscalculated, our readers will presently see. Mr. McDougall's trial commenced—the original note was returned by Captain Sturt to Mr. Stevenson, who put it in his pocket without examination and returned the certified copy to Captain Sturt. *That certified copy is now in* the possession of His Excellency the Governor." (1)

(1) *South Australian Register*, 20th July, 1839, page 3, cols. 1-3 inclusive.

(To be continued).

Markets for Australian Produce: Great Britain Easily the Most Important

[By W. J. Spafford, Director of Agriculture.]

To the people of a country to which the export of agricultural primary products is of great importance, and so to those of Australia, it should be of the utmost interest to know where the products which have to be exported are forwarded for sale, and a statement showing the destination of the principal export lines of Australia proves most enlightening.

Because of the marvellous natural conditions obtaining in some countries located in the same climatic zone as is Australia, and particularly in South America, the competition against most of our primary products is very intense indeed; nevertheless, as a people Australians are living at least as well as the peoples of any other countries of the world, and the country is making progressive advancement.

Progressive Development for Australia is made possible because the Commonwealth is part of the British Empire.

The political advantage of forming part of this wonderful Empire is so great that it more than counteracts many of the natural advantages possessed by some other countries, and this because Great Britain, the head of the British Empire, is the principal market in the world for all the agricultural primary products we have to export in quantity, except wine, and for several of the articles is practically the only market regularly importing appreciable quantities.

These facts, the importance of the markets of Great Britain for all of our exportable surplus of primary products, and the relative non-importance of any other markets for some of these products, are brought out in a striking manner in the following Table, which discloses the total imports of the world, and the three principal importing countries, for all primary products of which Australia has much to export.

IMPORTERS OF AUSTRALIA'S PRINCIPAL EXPORT LINES.

Article.	Unit.	World's Imports. Total Quantity.	Principal Importer.		Second Principal Importer.		Third Principal Importer.	
			Country.	Quantity.	Country.	Quantity.	Country.	Quantity
A. Mutton and Lamb* ..	1,000 cwts.	7,200	United Kingdom	6,989 (97·1%)	France....	157	Belgium	25
A. Beef*	1,000 cwts.	12,314	United Kingdom	11,647 (94·6%)	Italy	466	Japan	228
A. Bacon and Hams*	1,000 cwts.	7,579	United Kingdom	6.440 (85·0%)	Cuba	58	Germany..............	10
A. Pork*	1,000 cwts.	2,157	United Kingdom	1,082 (50·2%)	Germany..	667	Belgium	87
B. Butter†	1,000 lbs.	1,349,435	United Kingdom	1,095,624 (81·2%)	Germany..	166,245	United States of America	9,872
B. Cheese†	1,000 lbs.	562,058	United Kingdom	300,628 (53·5%)	Germany..	61,507	United States of America	59,851
B. Wool‡	1,000 lbs.	2,571,214	United Kingdom	879,321 (34·2%)	France....	362,091	Japan	261,981
A. Eggs†	1,000 great hundreds	47,759	United Kingdom	24,503 (51·3%)	Germany..	10,190	France................	1,968
B. Wheat§	100,000 lbs.	320,182	United Kingdom	110,684 (34·6%)	Italy	40,812	Belgium	26,247
B. Wheat Flour§	100,000 lbs.	23,666	United Kingdom	9,491 (40·1%)	Manchukuo	2,100	Netherlands	1,422
B. Barley §	100,000 lbs.	62,378	United Kingdom	19,926 (31·9%)	Belgium ..	10,567	France................	5,801
A. Apples*	1,000 tons	609	United Kingdom	363 (59·6%)	Germany..	78	France................	37
A. Pears*	1,000 tons	127	United Kingdom	64 (50·4%)	Germany..	18	France................	8
A. Citrus*	1,000 tons	1,778	United Kingdom	515 (29·0%)	France....	262	Germany..............	236
A. Raisins and Currants*.	1,000 tons	284	United Kingdom	128 (45·1%)	Germany..	64	Netherlands	24
B. Wine‖..............	1,000 galls. (Imp.)	82,290	Switzerland ...	20,650	Germany..	17,350	United Kingdom	15,830 (19·2%)

A. From publications of Imperial Economic Committee. B. From International Review of Agriculture.

* 1935. † 1936. ‡ 1935-36. § 1936-37. ‖ 1934-35.

Some Points in Wheat Growing

[Paper read at the Forty-eighth Congress of the Agricultural Bureau, September, 1937.]

[By R. C. Scott, Chief Agricultural Adviser.]

Introduction.

In this paper it is not proposed to review the whole practice of wheat growing in South Australia, but simply to draw attention to agricultural information that has accumulated during the past few years, and emphasise other points which although well-known to the majority of producers, are not adopted to the fullest extent by the farming community.

Wheat is the most important product in this State, and is likely to remain so for a very long time. It occupies first position with regard to the amount of money brought into the country from goods exported. The actual sum naturally varies from year to year according to the character of the season, and at times has almost equalled that for all other products, but on the average the return for wheat represents rather more than one-third of the total for produce exported overseas.

Next in importance is wool, but the value of this production is considerably less than that of wheat, and as a matter of fact it is only in an occasional season that the combined return for the pastoral and dairying industries exceeds that from wheat alone.

In the gross valuation of crops produced in South Australia, wheat is far and away the most important, contributing about 60 per cent. of the total, with grapes in second position with about 12 per cent. It will therefore be realised that the wheat crop contributes very materially to the wealth of the community, and any information that will lead to increased returns or more economic production must be of benefit to the State as a whole.

Rotation.

There is nothing more important in wheatgrowing than the order of cropping. All other operations may be efficiently carried out, but unless the land is in the right condition of fertility, maximum yields cannot be anticipated. No system of manuring can correct the position, and it is essential that the soil should be in a state congenial to the development of the wheat plant. If the land is overcropped the natural fertility becomes exhausted and eventually a stage is reached when a crop practically fails either because of the physical texture of the soil, loss of fertility or spread of disease.

In connection with rotation a long view must be taken and the cropping planned so that the fertility is not only maintained but preferably increased, whilst at the same time full profits are secured. It is possible that for a short period of time continuous cropping may result in the greatest cash return, but such treatment can only be carried out at the expense of the land, and sooner or later must be paid for.

Under special circumstances such as when virgin land is being handled, the growth of the natural vegetation, the absence of fences, lack of water for stock, etc., may compel intensive cropping for the first few years, but there is not the slightest doubt that this cannot continue indefinitely and the rotation must be widened if the land is to be successfully farmed for any length of time.

Probably the most important point in connection with rotation is the effect overcropping and bare fallowing have on the physical texture of the land. The soil constituent that has much influence in this respect is organic matter, and generally speaking the soils of our wheatgrowing areas are not particularly well supplied with this material, whilst at the same time what little is there is largely lost by the practice of barefallowing.

The action of organic matter is to hold light soils together and to separate the finer particles of heavy soils, making them more friable and easier to work. Consequently, drift is encouraged in light land from which the organic matter has been removed, whilst heavier soils become more compact, impervious to water, and tend to run together after rain.

As a result, in any crop rotation planned, provision must be made for the restoration of organic matter, and if possible, for the building up of reserve supplies. This means that from time to time the land must carry a grazing crop, and that livestock should be held for the utilisation of this pasture. Such widening of the rotation and a spacing of the wheat crop will mean that a smaller wheat area is planted, but does not necessarily imply that a smaller harvest will result, since the average yield will be higher because of the land being in better heart.

Experience has shown that under South Australian soil and climatic conditions the wheat crop must be preceded by a year of barefallow. Therefore the simplest rotation would be one in which the land is regularly cropped and fallowed in alternate years. Such a rotation can be carried out for some considerable time in land of high natural fertility, but in this case little organic matter is returned to the soil, and sooner or later the inclusion of other crops becomes necessary.

In some countries a comprehensive system of cropping is planned, but for the time being at any rate, that in South Australia is likely to remain relatively simple.

The next step after the bare-fallow wheat rotation is the inclusion of a soil building crop such as pease, or resting the land and improving the organic matter supply by grazing the pasture produced. This temporary pasture may simply consist of the natural herbage which makes its appearance fairly freely in most districts, but on the other hand there are some localities, particularly the red lands, that have received thorough fallow working where the pasture is often scarce in the first year after cropping. Under such circumstances the planting of one of the cereals, preferably oats for grazing purposes, is recommended. This practice has been successfully adopted on the Turretfield Seed Wheat Farm for some years and has resulted in the production of an abundance of good quality feed on land which under normal conditions would have carried little pasture in that particular year. The stubble is burned off in late autumn, light tillage given to the land, and seed and superphosphate combined in. The crop secured provides good grazing early in the season and again late in the year, when strong feed for finishing off the fat lambs for market is of such value. Furthermore, when good pastures prevail elsewhere on the farm, it is often possible to reserve at least portion of the oat crop from early spring onwards, and allow it to mature to a light hay or grain crop, thus providing a foodstuff for feeding in the lean period of the year, that is to say, in the following autumn. Where the natural pasture is relied upon to provide the grazing, an improvement is effected by planting Wimmera Rye grass with the wheat crop. About 2lbs. of seed per acre added by mixing with superphosphate, is sufficient, as the plants thus obtained seed freely and provide for a good establishment in the pasture year. In this connection only certified Wimmera Rye grass seed should be purchased, as there are appreciable differences in the strains of this pasture, some being much more valuable for grazing purposes than others.

Whilst considerable modification of any rotation must be made according to circumstances, the order of cropping for the medium to good rainfall wheatgrowing areas should be on the following lines:—

Barefallow—Wheat—Pasture.
Barefallow—Wheat—Oats for grazing.
Barefallow—Wheat—Pease.
Barefallow—Wheat—Oats or Barley—Pasture.

A wider rotation is required for the light textured soils of the medium to low rainfall districts and should include two or more years of pasture. The natural herbage in the grazing years would be assisted by the planting of cereals, Wimmera Rye grass or lucerne. Amongst the cereals that may be utilised for grazing is rye, as this plant has the power of growing in cold sandy soil when most other varieties are at a standstill and so is useful in land at all liable to drift.

Wimmera Rye grass is strongly recommended for the Mallee areas, as the presence of this pasture materially improves the grazing capacity of the land. No farmer should abandon the idea of planting Wimmera Rye grass because of any danger of the plant becoming a pest and depreciating crop returns. Despite the fact that some will make its appearance in the wheat, there is no doubt that under proper management it can be controlled, and when all aspects are taken into account, it will improve the gross return from the farm. Whilst satisfactory stands of lucerne have been obtained by planting the seed with the wheat crop, there is always danger that the competition may be too great and the young plants be crowded out. The safer method is to seed lucerne in the wheat stubble, when the straw affords protection to the young plants and helps it through the early stages of growth.

The principle behind rotations for the Mallee land is wide spacing of the fallow and wheat crop with periods where the land is devoted to pasture. Examples are as follows:—

Barefallow—Wheat—Cereals for grazing—Pasture.
Barefallow—Wheat—Pasture (Rye Grass)—Pasture (Rye Grass).
Barefallow — Wheat — Lucerne — Lucerne — Lucerne.

Cultivation of Wheat.

Because of the climatic conditions that prevail generally throughout South Australia, fallowing is absolutely essential in practically all the wheatgrowing districts. In most other countries a long period of fallow is not required, because rain falls regularly throughout the year and quickly compacts soil that has been disturbed by the plough; perennial plants predominate in the pastures and consequently the land is not infested with weed seeds that must be destroyed after germination; fertility is promoted because of the abundant pastures which are balanced with legumes, whilst the smaller areas and damp soils permit the land being prepared in ample time for seeding.

Such is not the case with us, and apart from any question as to whether a farmer would be able to prepare his fields if he waited until the autumn before commencing ploughing, fallowing the land for a whole season is absolutely essential for full wheat yields. It is the only way by which he can free the land of weeds and so allow the wheat to escape the competition which would otherwise depreciate his return. It is the only way by which he can be sure of so compacting the soil underlayers that plant roots are in close contact with moisture and food supplies at all times as they push their way through, and it is the only way by which the soil can be placed in the best condition for the activities of the soil bacteria which are constantly at work changing the organic matter into an available form.

Notwithstanding these facts there is still a high percentage of wheat crop planted on non-fallowed land, although it is pleasing to see that the proportion is steadily decreasing.

The wheat returns from fallowed and non-fallowed land are recorded by the Government Statist and the mean figures for the different districts of the State over the past five years are shown in the following Table:—

WHEAT GROWN ON FALLOWED AND UNFALLOWED LAND, 1932-1936.

Period.	Division.	Total Area.	Wheat Yield.	Wheat on Fallow.		Wheat on Non-Fallow.		Proportion Fallowed.
				Area.	Yield.	Area.	Yield.	
		Acres.	Bush.	Acres.	Bush.	Acres.	Bush.	%
1932-36 ..	Central	529,000	13·82	452,925	14·85	76,094	7·32	85·6
1932-36 ..	Lower North	794,008	14·19	699,887	15·02	94,121	7·71	88·2
1932-36 ..	Upper North	331,630	7·74	215,910	10·24	115,720	2·88	65·1
1932-36 ..	South-East	35,253	18·40	21,009	20·86	14,244	13·52	59·5
1932-36 ..	Western	975,878	6·69	384,573	8·79	591,305	4·68	39·4
1932-36 ..	Murray Mallee	759,158	6·67	516,045	7·77	243,113	4·15	67·98
1932-33 ..	State	4,066,782	10·43	2,420,674	12·86	1,646,108	6·86	59·52
1933-34 ..	State	3,821,795	9·26	2,508,581	11·60	1,313,214	4·78	65·64
1934-35 ..	State	3,188,225	8·61	2,233,258	11·02	954,967	2·98	70·05
1935-36 ..	State	2,989,490	10·58	2,095,668	12·81	893,822	5·34	70·10
1936-37 ..	State	3,058,457	9·39	2,193,470	11·22	864,987	4·74	71·72
1932-36 ..	—	3,424,950	9·65	2,290,318	11·90	1,134,620	4·94	66·90

From the foregoing Table it will be seen that the area harvested for grain has averaged a little less than 3½ million acres during the past five years.

For three seasons 1930-32 the acreage exceeded 4 millions, with 1931 the record year, with 4,180,513 acres under wheat for grain in South Australia. There was a rapid drop in subsequent years, due to the low prices prevailing, but the area of land planted has steadily increased since 1934. In the present season a further advance has been made, and the area will approximate 3¼ million acres. The mean yield is low, being less than 10bush. per acre, and it is in this direction that improvement in wheat production is likely to occur rather than by an appreciable increase in the area planted.

For example, from one aspect alone, namely, fallowing: If all the wheat was planted on fallowed land the average yield would rise to approximately 12bush. per acre, or about 2½bush. better than it is at the present time. Whilst it is not likely that we will ever reach a stage when all wheat is seeded on fallow, it is obvious from the above figures that there is room for considerable improvement. Practically one-third of the wheat area, or approximately a million acres of stubble or grass land, is still planted each year, and has the effect of reducing the acre yield. At the same time the position is steadily improving, and over the State there is 12 per cent. less non-fallowed land planted with wheat for grain than there was five years ago.

In the Murray Mallee the returns indicate quite a change in wheat cropping. Whereas only 40 per cent. of wheat was planted on fallow in 1926, the area has increased to make almost 75 per cent. in 1936.

As the land has become cleared of shoots and cropped on a more definite rotational system, so has the area of fallow land become greater.

However, such is not the case on Eyre's Peninsula, where, although there was an improvement in 1936, on the average less than 40 per cent. of the land devoted to wheat is fallowed in preparation for the crop. The advantages of fallowing cannot be disputed, since the statistical figures are the means of thousands of what may be termed experimental plots conducted on a practical scale. These show that over the State fallowing more than doubles the wheat return, and in some years and certain districts the difference is still greater. For instance, last year crops planted on fallowed land withstood the dry spring conditions better than those on non-fallowed areas, and the average yields were 11.22 and 4.74bush. per acre respectively.

Again, in the Upper North in 1935 the returns were 8.74bush. and 0.98bush. per acre, according to whether the land was fallowed or not, whilst several other results of a similar nature could be quoted. Consequently, should the advantages of fallowing happen to be disputed, it is necessary to investigate the special circumstances associated with the case. It is sometimes claimed that grass land from which the pasture has been burned in autumn, and the soil well cultivated, will return better yields than fallow land. This may be the case, but everything depends on the tillage that has been described as fallow.

Land situated in a dry district that is ploughed in spring and dry material, such as barley grass, turned under, is difficult to place in a suitable condition for the healthy growth of wheat plants. Unless abnormal late spring and summer rains are experienced the barley grass is not decomposed or the soil packed down, and consequently wheat planted in such land fails to a greater degree than that on grass land from which the dry material was burned and given thorough but shallow tillage to leave a compact seed bed.

Under such circumstances grass land may give higher yields than the so-called fallow, particularly when the pasture is rich in legumes, such as Burr Clover, but these results cannot be accepted as conclusive evidence, and the average returns, as shown in the foregoing table, are much more reliable.

Therefore, one of the most important points for maximum wheat returns is the fallowing of all land intended for this crop.

Experience has shown that in the preparation of fallow the depth of furrow need not be more than 3in. to 4in., and in most soils this initial tillage is best done with a plough. However, in light land that is inclined to drift, the cultivator is to be preferred as the fallowing implement. Under such conditions the grassy material or straw is allowed to remain in the field, although thinned out by stock, so as to avoid easy choking of the implement. After the cultivator has been through, the straw remains on the surface and helps to control soil movement to a much greater degree than is the case after ploughing.

Each year more and more evidence is accumulating to show the advantage of compact soil underlayers in fallow land. Such a condition provides for the vigorous growth of plants, and allows them to successfully resist "take-all" attack. As a result, this disease ceases to be a serious factor in wheat cultivation as soon as a rotation of cropping is practised and the wheat crop preceded by a year of properly prepared fallow. In this connection there is nothing better for packing down the soil particles than rain, and therefore, under the limited rainfall conditions of South Australia, fallowing must be done sufficiently early in the season to secure the assistance of the winter falls. At the conclusion of winter, tillage is given as often as weeds or surface crust render it necessary, and in soils of normal texture cultivating operations may take place as many as 10 or 12 times during the course of the season. On the other hand, in light soils such working would be impossible owing to the danger of drift, and sheep must be largely used to keep down weeds.

In the lighter lands early fallowing is equally important as in the heavier soils, whilst tillage should be as frequent as circumstances will permit, but when cultivation is dangerous the weed growth should be fed off with sheep. In this way the plants are prevented from seeding, and so fouling the land, whilst the loss of soil moisture that would otherwise occur is avoided. By tramping backwards and forwards across the ploughed land in search of food sheep help to pack down the soil, and so place it in a satisfactory condition.

Manuring.

Almost without exception, the soils of South Australia are deficient in phosphoric acid. This shortage is made good by applications of superphosphate, and therefore the most important question in connection with manuring is that concerning the most economic application. Notwithstanding the fact that the requirement of soils for phosphoric acid is well recognised, it is surprising to find that almost 15 per cent. of the area under crop in this State is seeded without the addition of manure. The Counties that are the worst offenders in this respect are situated in the Upper North and Far West Coast, and in these areas only about half the crops receive superphosphate. Such action is false economy, and it is certain that with normal seasonal conditions the cost of the manure used would more than be repaid by the additional crop harvested. Again, in the matter of the average dressing of superphosphate over the State as a whole, all the experimental work carried out has shown that this could with advantage be increased. The mean application of superphosphate to wheat crops is practically 80lbs. to the acre, and the heaviest dressings are those given in the South-East, where, on the average, the crops receive just over a hundredweight per acre. On the other hand, on Eyre's Peninsula and the Upper Northern districts the mean applications are only 58lbs. and 61lbs. per acre respectively. These are extremely light dressings, and examination of the experimental records set out in the Table on the following page will show that they can be economically increased.

In these experiments both 36 and 45 grade superphosphate have been used, but ignoring any difference in this respect the mean yields from 153 crops show that the maximum return has been harvested from the plot receiving the 2cwts. dressing. The ½cwt. application led to an acre increase of 3bush. 9lbs. over no manure, whilst a further ½cwt. improved the return to the extent of 1bush. 17lbs., but the additional 1cwt. making the 2cwts. dressing did not improve the yield in quite the same proportion and only gave 1bush. 28lbs. However, with wheat valued at 4s. per bushel and superphosphate at 4s. per cwt. this increase is payable, and without taking into account the residual effect of the manure upon the pasture that follows, a 2cwts. dressing of superphosphate is profitable from the increased grain return alone. Perhaps

SUPERPHOSPHATE EXPERIMENTS WITH WHEAT SOWN ON FALLOW LAND.

Location.	Average Annual Rainfall.	Period.	No. Manure.		½cwt. 45% Super.		1cwt. 45% Super.		2cwts. 45% Super.	
	Inches.	Years.	B.	L.	B.	L.	B.	L.	B.	L.
Appila	12·17	9	9	38	12	21	12	51	13	20
Nelshaby	12·03	9	9	12	10	25	10	46	11	23
Urania	15·38	9	12	57	16	27	18	7	19	45
Ungarra	16·94	9	19	31	24	10	25	30	28	11
Brownlow	10·72	3	10	18	10	54	10	29	10	53
Copeville	11·52	5	9	36	12	54	15	25	16	34
Rudall	11·72	5	8	7	10	22	12	31	12	6
Kimba	10·35	5	9	23	11	50	12	9	13	35
Cortlinye	8·87	4	4	9	4	48	5	24	5	51
Coorabie	11·73	3	5	3	5	26	8	25	9	4
Sandalwood	11·28	5	5	10	8	33	10	48	13	16
Yurgo	12·75	3	15	59	19	37	20	42	22	12
36 Per Cent. Superphosphate.										
Roseworthy	17·85	17	11	15	16	27	17	52	17	50
Veitch	12·08	14	12	41	13	41	15	20	16	25
Booborowie	17·62	13	19	32	24	28	26	22	28	6
Minnipa	13·81	13	12	9	16	29	17	40	18	59
Butler	15·00	9	10	13	15	38	17	43	21	6
Yurgo	12·75	6	11	37	21	8	22	59	26	45
Turretfield	18·11	5	12	59	15	32	15	11	16	2
Wilkawatt	16·00	4	5	57	6	56	8	13	10	19
Smoky Bay	10·61	3	14	50	16	9	16	25	18	55
Means—153 crops	—	—	11	8	14	17	15	34	17	2
Nett value with wheat at 4s. per bushel and superphosphate 4s. per cwt.	—	—	£2 4 6		£2 15 2		£2 18 3		£3 0 2	

the optimum amount lies somewhere between the 1cwt. and 2cwts. application, but in any case the average superphosphate manuring in the State, namely 80lbs. per acre can be at least doubled.

In order to show the influence of the average rainfall on the quantity of superphosphate that should be applied the yields from the different centres have been extracted according to whether they were produced on under or over 13in. annual precipitation. On this basis the following means were secured:—

Location.	No Manure.	½cwt. Super.	1cwt. Super.	2cwts. Super.
	B. L.	B. L.	B. L.	B. L.
Over 13in. annual rainfall (82 crops)	13 4	17 1	18 20	20 2
Net return	£2 12 3	£3 6 1	£3 9 3	£3 12 2
	B. L.	B. L.	B. L.	B. L.
Under 13in. annual rainfall (71 crops)	9 41	12 10	13 24	14 38
Net return	£1 18 9	£2 6 8	£2 9 7	£2 10 6

These figures show that in the wetter districts the average superphosphate dressing can be greater than that applied in drier localities. In both cases the 2cwts. application shows the greatest nett return, but for areas receiving less than 13in. of rain the difference compared with that for the 1cwt. dressing is less than 1s. per acre. On the other hand a similar comparison for the higher rainfall plots shows a gain of almost 3s. in favour of 2cwts. of superphosphate, and consequently this amount can be recommended for use in the better wheatgrowing land of the State and at least 1cwt. per acre for the lower rainfall country.

CARBONATE OF LIME.

Within recent years the use of lime as a fertiliser has been advocated in some quarters. Lime is an essential plant food, but the amount removed by plants is very small and it is exceptional to find a soil so deficient in this substance as to limit plant growth. Lime certainly has an important influence upon the physical properties of soils, but generally speaking the wheatgrowing lands of South Australia are well supplied with lime and the manurial value of this material is negligible.

So as to clearly indicate the position a series of plots were planned and from the results of 17 experiments situated in different parts of the State the following averages were secured:—

Treatment.	Yield Per Acre. Bush.	Lbs.
No manure	18	50
1cwt. Carbonate of Lime	18	33
1cwt. Superphosphate	23	28
1cwt. Superphosphate, 1cwt. Carbonate of Lime	22	25

In these experiments the wheat was planted on fallow land. The returns show that no advantage is gained by the use of carbonate of lime as a manure.

An application of 1cwt. to the acre did not result in any better crop than when no manure at all was added.

When dressings of equal weight of carbonate of lime and superphosphate are compared, it will be seen that there is an increase of nearly 5bush. of wheat in favour of the latter. Further, a combined dressing of both lime and superphosphate has not resulted in any greater yield than when superphosphate only was used. Consequently no recommendation in favour of carbonate of lime as a fertiliser for cereal crops can be made. Purchase of this material as a fertiliser represents a dead loss and the money so utilised could be put to much more profitable use by the purchase of superphosphate.

MANGANESE.

A special manure that has proved its value for crops planted on Southern Yorke Peninsula is manganese. In the soils of the world it is most unusual to find a deficiency of manganese, but this has proved to be the case on land extending from near Warooka along the footlike portion of Yorke Peninsula, together with isolated spots in the vicinity of Port Lincoln.

The experimental work has been done with barley, but in these areas a mixed manure of superphosphate and manganese sulphate is universally applied with all crops. The results of the experiments that have been conducted over the past six years show that the most profitable dressing is about 28lbs. to the acre, whilst an application as low as 14lbs. per acre has made all the difference between absolute failure and an eight bag crop in the manganese deficient patches.

The mixed manure is available commercially and is regularly used throughout the area mentioned, but in other districts of the State there is no lack of available manganese in the soil and consequently there is no advantage in adding this fertiliser.

This point is emphasised because there has been a tendency for farmers to apply manganese in areas where no benefit could be anticipated.

NITROGEN.

A good deal of publicity has been given to the use of nitrogen on stubble sown crops, and although it is not recommended that wheat be planted on other than fallowed land, it is considered advisable to briefly outline the experimental results that have been obtained with this fertiliser.

During the past three seasons nitrogen in the form of sulphate of ammonia has been tested on barley crops at forty different centres. The results have varied within wide limits and everything appears to depend upon the previous history of the field planted. In the majority of cases an economic increase in yield has not been obtained, and at 27 centres, that is to say in 68 per cent. of the trials the 1cwt. of superphosphate plot averaged 23.4 bush. 1cwt. of superphosphate and ½cwt. of sulof ammonia, 24.8 bush. and 1cwt. of superphosphate and 1cwt. of sulphate of ammonia, 26.6 bush. of barley per acre. Therefore the addition of ½cwt. of sulphate of ammonia has only increased the barley yield by 1.4 bush. and a 1cwt. dressing by 3.2 bush. per acre.

In the mixed manure, sulphate of ammonia costs approximately 14s. per cwt., and consequently these increases are not sufficient to meet the cost of the fertiliser.

On the other hand, in 13 plots substantially increased yields were harvested, and for superphosphate only the average return for these 13 centres was 29.1 bush., whilst for the addition of ½cwt. and 1cwt. of sulphate of ammonia the yields amounted to 37.4bush. and 42.2bush. of barley per acre respectively.

These are quite appreciable increases, and under the conditions obtaining for these plots the use of nitrogen has been quite profitable. However, in practically all instances there have been special circumstances associated with the management of the land on which the crop was planted, and the soil has not had an opportunity of building up a supply of organic nitrogen. Where a rotation has been adopted in which no grazing years are included or in the case of relatively new land that has not carried leguminous plants in its natural state, or where lucerne flea or other factors have prevented the development of clovers in the pastures, sulphate of ammonia applied to stubble sown crops has had an appreciable effect.

Similar results have been secured with oats. This cereal has been planted at 18 centres, and in 12 of the series no benefit from the nitrogenous fertiliser was secured, the average yields from each treatment being practically equal. However, in the other 6 plots which represent 4 centres, ½cwt. of ammonia gave an increase of 7.1bush., and 1cwt. an increase of 10bush. of oats per acre.

Each season substantial improvement was gained in a particular class of country at Gawler River where the natural pasture did not include any appreciable quantity of leguminous herbage.

As the result of these trials sulphate of ammonia cannot be generally recommended in South Australia, although there are conditions under which its use is economic.

However, it is probable that applications of sulphate of ammonia are only a temporary measure, and when an approved rotation is adopted in which full dressings of superphosphate are utilised the requirements of the land for mineral nitrogen will be eliminated. Consequently the position regarding sulphate of ammonia for stubble sown crops must be carefully examined, since in these experiments its use has not proved a payable proposition in the majority of cases. It is an expensive fertiliser, and the same money put into superphosphate to promote leguminous pasture growth and thus indirectly the development of nitrogen is likely to be a more economic procedure.

Varieties.

In connection with the varieties of wheat that should be planted, there are two aspects that have to be taken into consideration, namely, the yield per acre that can be anticipated, and the effect the production of that class of grain will have on the milling quality of the wheat exported. So far as the farmer is concerned, yield is the more important factor, since all wheat exported commands the same price per bushel irrespective of baking quality so long as it reaches the f.a.q. standard for that particular season. However, of recent years the value of Australian wheat on the English market has depreciated, and this has had an effect upon the price that the exporter can quote to the producer. Consequently where there are two varieties of approximately equal yielding ability for his conditions, the farmer should choose the one from which flour can be milled with the capacity of producing good well-shaped, nice textured loaves. That is the position at the present time, but for some years past the wheat breeders of the Commonwealth have been giving close attention to the question of flour strength, and there is little doubt that new varieties will shortly be available possessing both good bread making qualities and yielding ability.

At the same time it is not desirable to go beyond the standard previously attained by Australian wheat, which was in demand by English Millers, because of special characteristics of colour and flavour it possessed, making it particularly suitable for blending with Canadian wheat.

Therefore in the production of new varieties, the aim of the breeder is to evolve types that will maintain the average standard of Australian wheat at what it was prior to 1931, when it invariably commanded a premium above that imported into England from any other country.

The necessity for such improvement is shown by the following figures:—

WHEAT PRICES PER QUARTER OF 480LBS.

Year.	Canada.			Argentine.			Australia.		
	£	*s.*	*d.*	£	*s.*	*d.*	£	*s.*	*d.*
1926	2	19	2	2	18	3	3	1	0
1927	2	13	10	2	11	9	2	14	10½
1928	2	7	5	2	8	1½	2	10	0
1929	2	6	10	2	6	3	2	10	0
1930	1	19	8		—		2	2	7½
1931	1	2	0	0	19	6	1	2	9
1932	1	8	4½	1	5	10	1	7	9
1933	1	7	1	1	3	3	1	6	1½
1934	1	8	4	1	1	6	1	4	10½
1935	1	11	4	1	2	10	1	5	6
1936	1	16	8		—		1	15	4½

The foregoing figures were taken from "Broomhall's Corn Trade Year-Book," and represent the mean prices quoted at the beginning of January and August in every year, whilst the value given for Canadian wheat is the average price of No. 1 Manitoba and No. 2 North Manitoba grain.

The average prices for each month were not available and possibly if the means were calculated on this basis, slightly different annual values would be shown. However, the figures are strictly comparable, whilst other statistics indicate that from 1904 to 1931, the price for Canadian wheat only exceeded that for Australian on three occasions, the differences being 7d., 11d., and 2s. 3d., per quarter respectively. Over the last five seasons Australian grain has lost ground, and in 1935 the price was 5s. 10s. per quarter less than Canadian. At the same time wheat from the Commonwealth has consistently commanded a higher price than that from the Argentine.

It is obvious that something has to be done to correct the position and until improved wheats are available the first step is the exclusion of the very weak flour strength varieties. The poorest commercial wheats in this connection are Gallipoli, Ghurka, Cluclub and Waratah.

Attention has been drawn to their low baking quality, and the total area planted with these four varieties in South Australia has been very materially reduced, with the result that the drift toward poorer flour strength has been largely arrested in this State.

The leading varieties planted are shown in the following Table:—

LEADING WHEAT VARIETIES PLANTED IN SOUTH AUSTRALIA, 1931-35.

Variety.	1931.		1932.		1933.		1934.		1935.	
	Acreage.	Position.	Acreage.	Position.	Acreage.	Position.	Acreage.	Position.	Acreage.	Position.
Ranee	146,613	8	305,966	4	432,771	2	495,175	2	580,833	1
Nabawa	802,730	1	945,869	1	915,520	1	682,464	1	563,652	2
Sword	2,922	—	23,047	—	105,494	8	277,715	4	360,686	3
Waratah	141,939	9	209,362	6	251,450	6	241,559	5	221,607	4
Gluyas.......	570,696	2	493,365	2	385,311	4	219,069	6	191,559	5
Ford	203,250	7	193,035	7	264,970	5	214,317	7	175,439	6
Gallipoli	234,891	5	325,961	3	398,496	3	295,503	3	141,999	7
Ghurka	14,313	—	19,251	—	40,107	—	68,232	9	122,484	8
Late Gluyas .	324,751	3	261,352	5	170,966	7	125,936	8	86,390	9
Merredin.....	7,590	—	12,632	—	28,277	—	41,109	14	55,039	10

Probably the worst offender in the matter of flour strength is Gallipoli, and it will be noted that the area planted with this variety has been reduced by over a quarter of a million acres in the last two years.

The acreage thus lost has been largely made up by an increased area of Ranee and Sword. Neither of these wheats are of particularly high milling quality, but as they are both superior to Gallipoli an improvement in the general average standard has been effected.

For four years Nabawa was the most popular wheat in the State, nearly a million acres being planted in both 1931 and 1932, but this year it has been displaced by Ranee.

A wheat that is being seeded on increasing areas is Merredin, a Federation—Gluyas crossbred, originating in Western Australia. It is a hardy variety possessing moderate disease resistance, and has yielded consistently well both on the red lands of the north and the lighter soils of the Government Farm at Minnipa.

With the exception of Sword, Ghurka, and Merredin, all the wheats listed in the above table have been extensively planted for several years, and can therefore be accepted as proved varieties for South Australian conditions. However, it is well-known that over the State these conditions vary within wide limits, and special types of wheat must be planted according to the circumstances of the district.

Whilst there will be some overlapping, depending upon the time of seeding, a general grouping of the varieties would be on the following lines:—

Gluyas, Late Gluyas, Nabawa, Ranee, Sword, and Waratah for the lighter rainfall country with soils of light texture or containing appreciable quantities of lime.

Ford, Merredin, Ranee, and Sword for areas receiving fair average rainfall and soils of medium texture, with the first-named variety particularly recommended for districts at all subject to red rust.

Gallipoli and Ghurka for the wetter and more fertile areas of the South-East.

Another guide to the most suitable wheats for any district is to note those seeded to the greatest extent, and in this connection the most popular varieties for the different areas are:—

Eyre's Peninsula—Nabawa, Gluyas, Waratah, Late Gluyas.

Upper North—Ranee, Nabawa, Gluyas, Sword.

Lower North—Ranee, Sword, Nabawa, Ford.

Central—Sword, Ranee, Nabawa, Waratah.

Murray Mallee—Nabawa, Ranee, Gallipoli, Sword.

South-East—Gallipoli, Ranee, Ghurka, Ford.

Of the newer wheats, Baringa, Bencubbin, and Dundee appear to be of the most value.

Bencubbin is the result of a cross between Gluyas and Nabawa made at the Merredin Experimental Farm in Western Australia. It has inherited hardiness from Gluyas and resistance to flag smut from Nabawa. Bencubbin has rapidly increased in popularity in the State in which it was raised, but it is not of particularly good baking quality.

Baringa and Dundee are New South Wales crossbreds, the former being raised by crossing Bomen, Yandilla King, and Zaff, and the latter by mating Hard Federation and Sands.

Dundee is rather susceptible to rust, but Baringa is more disease resistant generally. Both possess high yielding ability and have done well in the better class lands of the State where they are likely to displace varieties, such as Gallipoli and Ghurka.

Summary.

To briefly summarise the position, the most important points for improved wheat production in South Australia are:—

1. Space the wheat cropping over a wider period, and include pasture years in the rotation.
2. Confine the planting of wheat to well-prepared fallow land.
3. Increase the superphosphate applications for the lower rainfall districts to at least 1cwt. per acre, and for the higher rainfall areas to within the vicinity of 2cwts. per acre.
4. Wherever possible, discard very low milling quality varieties, and build up the standard of Australian export wheat to its previous level.

The Crossbred as an Export Pig

BREEDING EXPERIMENTS CONDUCTED AT ROSEWORTHY AGRICULTURAL COLLEGE.

[By R. BAKER, R.D.A. (Dairy Superintendent).]

South Australia, with its numerous breeds, is faced with the problem of producing pigs of a type that will meet the exacting demands of the present day butcher and bacon curer, particularly if carcasses are intended for the overseas trade.

Included in the breeds are those which in the past were recognised and valued for their particular characteristics, but which to-day, owing to their short bodies, heavy shoulders and aptitude to lay on heavy layers of fat are no longer suited for modern requirements.

LARGE WHITE BOAR.—The type of sire used in the breeding of three crosses referred to in this article:—Large White x Tamworth x Berkshire; Large White x Berkshire (old type); and Large White x Berkshire (Canadian x Old Type).

[*Pig Breeders Annual.*]

Due to a very wide range of conditions, mainly climatic, the production of any one breed or cross which will provide a standard type is at present not possible, but is a question that should receive due consideration from any country if it is to compete successfully in supplying pigs for the English market. Consequently a standard type must be evolved from breeds, or a combination of breeds, in existence.

The Agent-General and Trades Commissioner (Mr. C. F. G. McCann), in his report on the carcasses shipped to England, points out that with rigorous selectivity, it would be possible for South Australia to give British buyers the type of pig they demand, when such breeds as the Large White, Tamworth, and Canadian Berkshire are available for crossing, or even straight breeding.

Recognising the number of breeds available, and the question that arises from time to time, as to the suitability of the crossbred pig for the English market, the Principal (Dr. A. R. Callaghan) decided that the College should carry out a trial which would have for its primary object the production of carcasses of different breeds and their crosses for shipment to England and criticism as to their fitness for trade purposes. In addition, an opportunity was taken to test out the relative speed and economy of fattening, by determining the length of time and the quantity of foodstuffs required in each case for the development from a weaner to a bacon weight.

It was the original intention to obtain a number of animals of each breed available, and as many combinations as possible. To date, the following crosses have been bred and sent from the College:—

Large White x Tamworth x Berkshire (old type).
Large White x Berkshire (old type).
Tamworth x Berkshire (old type).
Tamworth x Mid York.
Canadian Berkshire x Mid York.
Large White x Berkshire (Canadian x old type).
Tamworth x Large Black.
Canadian Berkshire x Large Black.

Although two of the crosses, Tamworth x Large Black and Canadian Berkshire x Large Black, are unusual and not likely to become popular, they give added interest when comparing them with others that are more common and may be seen at times in any of our sale yards. Individual breeds and further combinations will be considered in due course.

To carry out the test all groups consisted of six pigs, with the exception of the Canadian Berkshire x Large Black, where only five were available. The pigs were fed to bacon weight, approximately 160-180lbs. live, and at the completion of feeding, four from each group were slaughtered at the Produce Depot, and the carcasses shipped overseas.

It was not possible to have the different crosses available at the one time, with the result the pigs arrived in England in three consignments, each consignment being criticised by the Agent-General, or at his request by a leading authority.

CRITICISM OF CARCASSES.

The first consignment (Group I.), consisting of the crosses Large White-Tamworth-Berkshire (old type), Large White-Berkshire (old type), and Tamworth-Berkshire (old type) were shipped to London by the s.s. *Hobson's Bay* in June, 1934.

At the request of the Agent-General, Mr. Whitney, of the Stockbreeders' Meat Company, made the following comments:—

"All pigs were very good baconers, and suitable for the United Kingdom trade. It is considered that the double cross Large White-Tamworth-Berkshire had a slight advantage over the single crosses, and further the Tamworth-Berkshire cross is a little better than the Large White-Berkshire cross owing to the fact that the pigs are leaner and not so heavy at the shoulders."

The second consignment (Group II.), consisting of the Tamworth-Large Black cross, shipped to London by the s.s. *Waimana* in August, 1935, was inspected by the Agent-General on arrival.

Mr. McCann made the following report:—

"The cross Tamworth-Large Black gave them length of bacon side which has much to commend, and I was agreeably impressed with the hind quarters or ham proportions, also the firmness of shoulder. Condition was just about right, but the length of leg is apt to discount the true proportions of the body to the eye. The black hair showed up very plainly on the rind, and would, to a degree, depreciate the value. This opens up the question of the use of singeing. I am of the opinion that wherever black coloured pigs are used, singeing must be resorted to when it is intended that the carcasses are to be used for bacon production.

"These pigs were well dressed, but no matter how well dressing has been performed the rind shows up dark and unsightly, unless singed."

The third consignment (Group III.), consisting of the crosses, Tamworth-Mid York, Canadian Berkshire-Mid York, Large White-Berkshire (Canadian x old type), and Canadian Berkshire-Large Black, shipped to London by s.s. *Barrabool* in February, 1936, was also inspected by the Agent-General. As with the previous shipment Mr. McCann gave a comprehensive report as follows:—

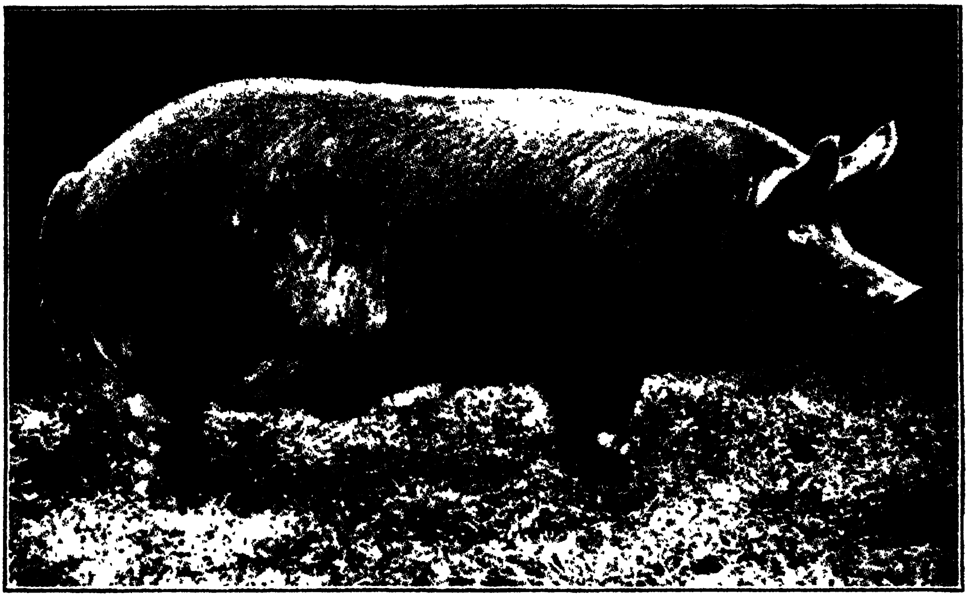
> *Large White* x *Berkshire* (Canadian x old type).—These are nice pigs badly marked by fighting. Very good length of bacon side, with plump well-filled loins. Ribs well sprung. Perhaps they could be improved with finer shoulders, but this is a Berkshire characteristic. The quality of the rind was excellent. Condition was in accordance with modern trade requirements. Fighting marks and thicker shoulders than one would have liked, spoilt a real good sample of what the trade to-day demands, but it appears that this cross will be acceptable. Points awarded 90.
>
> *Tamworth* x *Mid York.*—The pigs stripped very attractively despite fight marks. The hams were good, but the length of bacon side was not as good in these exhibits as that of the Large White-Berkshire cross. The quality of the rind was very good and the general outward appearance pleasing. Condition was just about right. It would appear that this is also a cross quite acceptable to buyers here. Points awarded 88.
>
> *Canadian Berkshire* x *Mid York.*—Very nice pigs, but irregular in condition, one grossly fat. Hams good but varying in shape. Shoulders finer than in other crosses. No real reason for serious criticism, good length of side, rind variable. Suitable type for export, but not just quite as likeable as previous lots. Points awarded 86.
>
> *Canadian Berkshire* x *Large Black.*—Shoulders fine, condition satisfactory, rind variable, some coarse with black hairs showing through. Length of side good. Type quite acceptable to trade if better scraped or singed. Points awarded 83.

Mr. McCann also made the comment that in general conformation all pigs would compare very favourably with what the market is asking for. Unfortunately the carcasses were badly marked, apparently due to fighting before slaughter. The scarred sides look unattractive, and will affect marketing. Those responsible for scalding want to ensure that the water is exactly the right temperature before pigs are immersed, otherwise they are bound to vary, and scraping can never be satisfactorily done, particularly with black haired pigs.

Continuing, Mr. McCann states that England and Australia are facing similar problems in pig production because the modern butcher is demanding a long lean pig. Both England and Australia are blessed with too many breeds which in old days had their particular virtue, but which to-day are unsuited for modern butchers' requirements, but with the Large and Mid White, Tamworth, and Canadian Berkshire available for crossing, or even straight breeding, it would be possible with vigorous selectivity for South Australia to give British buyers the type they demand.

FEEDING.

The aim in feeding was to restrict as far as possible the compounding of rations to foods that were available on the farm, but as it was not possible to have all pigs available at the one time it was necessary to make adjustments in the feeding of the different groups. Meatmeal was the only food purchased.



TAMWORTH BOAR.—The type of sire used in the breeding of three crosses referred to in this article:—Tamworth x Berkshire (old type); Tamworth x Mid. York; and Tamworth x Large Black.

[*Pig Breeders Annual.*]

In all cases it was recognised that to provide a carcass carrying a wealth of lean meat, the animal should be fed a ration containing a relatively high proportion of protein, for this reason the supplementary foods, meatmeal, skim milk, and green feed, were used wherever possible, in conjunction with a grain mixture of wheat, barley, and peas.

In the first group, the three crosses, Large White-Tamworth-Berkshire (old type), Large White-Berkshire (old type), and Tamworth-Berkshire (old type) were fed mainly barley and wheat, supplemented at different periods by crushed peas, meatmeal, skim milk, and lucerne.

The second group, the cross Tamworth-Large Black was fed a definite ration of 5 parts wheat, 2 parts barley, 1 part peas, and ½ part meatmeal during the whole of the fattening period; in addition, the pigs were allowed daily grazing on rye grass.

Group three, Tamworth-Mid York, Canadian Berkshire-Mid York, Large White-Berkshire (Canadian x old type), and Canadian Berkshire-Large Black, were fed a grain mixture of 5 parts wheat, 2 parts barley, 1 part peas. During the early stages meatmeal was fed at the rate of 5lbs. per 100lbs. of grain. This was slightly reduced later and skim milk added in the proportion of 1 to 1 with grain.

The Tables were compiled to show the amount and rate of increase with each cross-breed, and the amount of feed necessary for development.

TABLE I.—*Showing Rate of Increase.*

Tag and Sex.	Initial Weight.	Total Weight.	Increase.	Days Fed.	Increase Per Day.
	Lbs.	Lbs.	Lbs.	Days.	Lbs.
LARGE WHITE x TAMWORTH x BERKSHIRE (OLD TYPE).					
K74, Sow	41	183	142	101	1·406
382, Barrow	41	186	145	87	1·666
381, Barrow	40	171	131	87	1·566
393, Sow	32	167	135	101	1·336
394, Sow	35	177	142	101	1·406
K73, Sow	41	183	142	101	1·406
Total	230	1,067	837	578	8·726
Mean	38·33	177·83	139·50	96·33	1·454
LARGE WHITE x BERKSHIRE (OLD TYPE).					
No Tag, Barrow	45	174	129	92	1·402
383, Barrow	45	190	145	87	1·666
No Tag, Sow	50	181	131	92	1·424
385, Barrow	54	189	135	87	1·552
386, Barrow	56	189	133	87	1·528
384, Barrow	40	174	134	87	1·540
Total	290	1,097	807	532	9·112
Mean	48·33	182·83	134·50	88·66	1·518
TAMWORTH x BERKSHIRE (OLD TYPE).					
387, Barrow	59	165	106	87	1·218
No Tag, Barrow	36	132	96	101	·950
No Tag, Barrow	43	161	118	101	1·168
397, Barrow	40	179	139	101	1·377
396, Barrow	44	170	126	101	1·247
395, Sow	35	174	139	101	1·377
Total	257	981	724	592	7·337
Mean	42·83	163·50	120·66	98·66	1·223
TAMWORTH x MID YORK.					
31, Barrow	55	177	122	86	1·42
32, Sow	55	137	82	86	·95
33, Barrow	52	172	120	86	1·39
34, Sow	48	138	90	86	1·04
35, Barrow	39	146	107	86	1·24
36, Barrow	41	154	113	86	1·31
Total	290	924	634	516	7·35
Mean	48·33	154·00	105·66	86·00	1·225
CANADIAN BERKSHIRE x MID YORK.					
25, Sow	70	162	92	86	1·07
26, Barrow	71	196	125	86	1·45
27, Sow	76	206	130	86	1·51
28, Barrow	72	198	126	86	1·46
29, Barrow	53	164	111	86	1·29
30, Barrow	39	106	67	86	·78
Total	381	1,032	651	516	7·56
Mean	63·50	172·00	108·50	86·00	1·260

TABLE I.—*continued.*

Tag and Sex.	Initial Weight.	Total Weight.	Increase.	Days Fed.	Increase Per Day.
	Lbs.	Lbs.	Lbs.	Days.	Lbs.
LARGE WHITE x BERKSHIRE (CANADIAN x OLD TYPE).					
37, Barrow	54	174	120	86	1·39
38, Barrow	38	145	107	86	1·24
39, Sow	44	157	123	86	1·43
40, Sow	38	137	99	86	1·15
41, Sow	35	150	115	86	1·34
42, Sow	36	149	113	86	1·31
Total	245	922	677	516	7·86
Mean	40·83	153·66	112·83	86·00	1·131
CANADIAN BERKSHIRE x LARGE BLACK.					
43, Barrow	60	200	140	75	1·86
44, Sow	51	159	108	75	1·44
45, Sow	57	189	132	75	1·76
46, Barrow	35	129	94	75	1·25
47, Barrow	55	212	157	75	2·09
Total	258	889	631	375	8·40
Mean	51·60	177·80	126·20	75·00	1·680
TAMWORTH x LARGE BLACK.					
398, Barrow	59	192	133	62	2·14
399, Sow/	59	185	126	62	2·03
400, Sow	59	152	93	62	1·50
401, Barrow	65	193	128	62	2·06
402, Sow	66	187	121	62	1·95
403, Sow	60	159	99	62	1·52
Total	368	1,068	700	372	11·20
Mean	61·33	178·00	116·66	62·00	1·866

SUMMARY OF ALL GROUPS.

Breeding.	Initial Weight.	Total Weight.	Increase.	Days Fed.	Increase Per Day.
	Lbs.	Lbs.	Lbs.	Days.	Lbs.
Large White x Tamworth x Berkshire (old type)	38·33	177·83	139·50	96·33	1·454
Large White x Berkshire (old type)	48·33	182·83	134·50	88·66	1·518
Tamworth x Berkshire (old type)	42·83	163·50	120·66	98·66	1·223
Tamworth x Mid York	48·33	154·00	105·66	86·00	1·225
Canadian Berkshire x Mid York	63·50	172·00	108·50	86·00	1·260
Large White x Berkshire (Canadian x old type)	40·83	153·66	112·83	86·00	1·310
Canadian Berkshire x Large Black	51·60	177·80	126·20	75·00	1·680
Tamworth x Large Black	61·33	178·00	116·66	62·00	1·866

From the foregoing summary it will be seen that the average daily increase of the different crosses varies considerably, a fact that is due to some extent to the necessity of making adjustments in the composition of the various rations in accordance with foods that were available on the farm at the time the different groups were being fed. In order to make a true comparison all pigs should have been fed in a similar manner, and during the same period. This was not possible. The results obtained as far as the trial has gone will provide interesting data.

The Table demonstrates that the rate of development was greatest in the crosses where the Large Black was used as the dam, particularly in the group sired by the Tamworth, where four of the six pigs show a daily increase in weight of approximately 2lbs., while the average of the six pigs for a feeding period of 62 days was 1.866lbs. In addition to a grain ration these pigs were allowed daily grazing on rye grass for approximately four hours. The Canadian Berkshire-Large Black closely followed with an average daily increase of 1.68lbs.

Of the more common crosses, those sired by the Large White showed to better advantage than when either the Tamworth or Canadian Berkshire boars were used. The average daily increase being Large White-Berkshire (old type), 1.518lbs.; Large White-Tamworth-Berkshire, 1.454lbs.; Large White-Berkshire (Canadian x old type), 1,310lbs.; Canadian Berkshire-Mid York, 1.260lbs.; Tamworth-Mid York, 1.225lbs.; and Tamworth-Berkshire, 1.223lbs.

It will be noticed that the crosses having the Mid York as the dam were among the slowest to mature.

TABLE II.—*Showing Food Consumed.*

GROUP I.

Food.	Quantity of Food Consumed.		Days Fed.	Quantity of Food Consumed Per Day.		Total Increase.	Quantity of Food Per Lb. of Increase.	
	Bulk.	Dry Matter.		Bulk.	Dry Matter.		Bulk.	Dry Matter.
	Lbs.	Lbs.	Days.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.
LARGE WHITE x TAMWORTH x BERKSHIRE (OLD TYPE).								
Barley	1,366·3	1,162·72	—	14·18	12·06	—	1·63	1·39
Wheat	1,290·3	1,117·39	—	13·39	11·59	—	1·54	1·34
Peas	196·8	169·24	—	2·04	1·75	—	·23	·20
Skim Milk	872	81·96	—	9·05	·85	—	1·04	·10
Meat Meal	134·7	120·15	—	1·39	1·24	—	·16	·14
Lucerne	83	19·92	—	·86	·20	—	·10	·02
Total	3,943·1	2,671·38	96·33	40·91	27·69	837	4·70	3·19
Mean per Pig	657·18	445·23	—	6·81	4·61	139·50	—	—
LARGE WHITE x BERKSHIRE (OLD TYPE).								
Barley	1,438·6	1,224·24	—	16·22	13·80	—	1·78	1·51
Wheat	1,389·0	1,202·87	—	15·66	13·56	—	1·72	1·49
Peas	214·3	194·29	—	2·41	2·19	—	·26	·22
Skim Milk	968·0	90·99	—	10·91	1·02	—	1·12	·11
Meatmeal	145·0	129·34	—	1·63	1·45	—	·18	·16
Lucerne	83·0	19·92	—	·92	·22	—	·10	·02
Total	4,237·9	2,861·65	88·66	47·75	32·24	807	5·16	3·51
Mean per Pig	706·31	476·94	—	7·96	5·37	134·50	—	—
TAMWORTH x BERKSHIRE (OLD TYPE).								
Barley	1,200·1	1,021·28	—	12·16	10·35	—	1·65	1·40
Wheat	1,150·1	995·98	—	11·65	10·09	—	1·59	1·38
Peas	196·8	169·24	—	1·99	1·71	—	·27	·23
Skim Milk	952·0	89·48	—	9·65	·91	—	1·31	·12
Meatmeal	116·9	104·27	—	1·18	1·05	—	·16	·14
Lucerne	82	19·68	—	·83	·19	—	·11	·03
Total	3,697·9	2,399·93	98·66	37·46	24·30	724	5·09	3·30
Mean per Pig	616·31	396·65	—	6·24	4·05	120·66	—	—

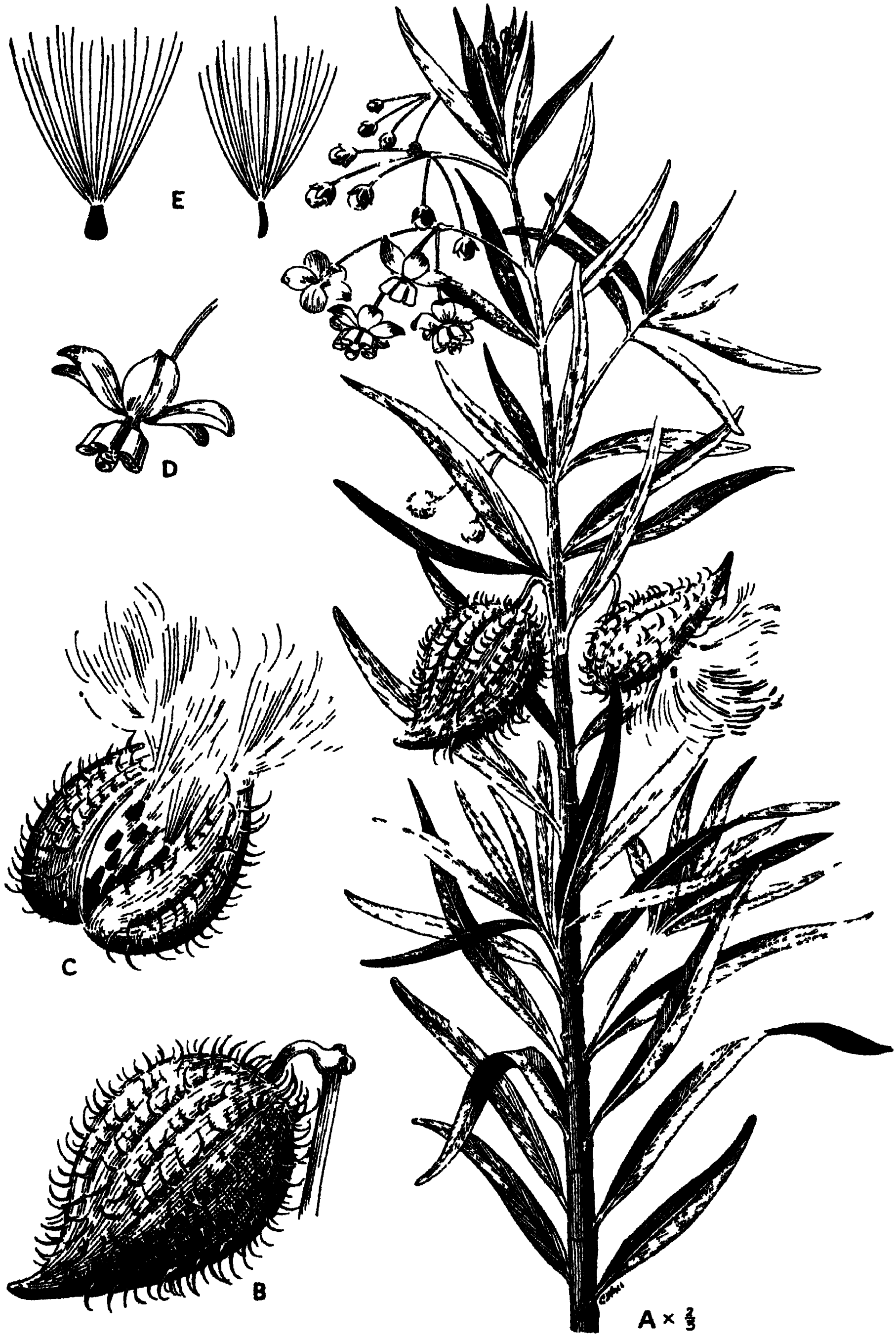


PLATE II. NARROW-LEAVED COTTON-BUSH (*Asclepias fruticosa, L.*)
A.—Branch with flowers and fruits. B.—Ripe fruit. C.—Fruit in process of dehiscence.
D.—Flower. E.—Seeds.

To face page 8.]

TABLE II.—*continued.*

Food.	Quantity of Food. Consumed.		Days Fed.	Quantity of Food Consumed Per Day.		Total Increase.	Quantity of Food Per Lb. of Increase.	
	Bulk.	Dry Matter.		Bulk.	Dry Matter.		Bulk.	Dry Matter.
	Lbs.	Lbs.	Days.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.
GROUP III.								
TAMWORTH x MID YORK.								
Wheat	1,132·5	980·74	—	13·17	11·40	—	1·18	1·54
Barley	453·0	385·50	—	5·27	4·48	—	·71	·61
Peas	226·5	194·79	—	2·63	2·26	—	·36	·30
Meatmeal	96·75	86·30	—	1·12	1·00	—	·15	·13
Skim Milk	1,588·0	149·27	—	18·47	1·73	—	2·50	·23
Total	3,496·75	1,796·60	86	40·66	20·87	634	5·50	2·81
Mean per Pig	582·76	299·43	—	6·77	3·48	105·66	—	—
CANADIAN BERKSHIRE x MID YORK.								
Wheat	1,247·5	1,080·33	—	14·50	12·56	—	1·91	1·66
Barley	499·0	424·64	—	5·80	4·94	—	·76	·65
Peas	249·5	214·57	—	2·90	2·49	—	·39	·34
Meatmeal	108·5	96·78	—	1·26	1·12	—	·17	·15
Skim Milk	1,648·0	154·91	—	19·16	1·80	—	2·53	·24
Total	3,752·5	1,971·23	86	43·62	22·91	651	5·76	3·04
Mean per Pig	625·41	328·54	—	7·27	3·82	108·50	—	—
LARGE WHITE x BERKSHIRE (CANADIAN x OLD TYPE).								
Wheat	1,147·5	993·73	—	13·34	11·62	—	1·69	1·47
Barley	459·0	390·60	—	5·34	4·54	—	·68	·58
Peas	229·5	197·37	—	2·67	2·29	—	·34	·29
Meatmeal	98·5	87·86	—	1·14	1·02	—	·14	·13
Skim Milk	1,604·0	150·77	—	18·67	1·75	—	2·37	·22
Total	3,538·5	1,820·33	86	41·16	21·22	677	5·22	2·69
Mean per Pig	589·75	303·39	—	6·86	3 54	112·83	—	—
CANADIAN BERKSHIRE x LARGE BLACK.								
Wheat	1,007·5	872·49	—	13·43	11·63	—	1·59	1·38
Barley	403·0	342·95	—	5·37	4·57	—	·64	·54
Peas	201·5	173·29	—	2·68	2·31	—	·32	·27
Meatmeal	84·5	75·37	—	1·13	1·00	—	·13	·12
Skim Milk	1,588	139·27	—	21·17	1·85	—	2·51	·22
Total	3,284·5	1,603·37	75	43·78	21·36	631	5·19	2·53
Mean per Pig	656·90	320·67	—	8·75	4·27	126·20	—	—
GROUP II.								
TAMWORTH x LARGE BLACK.								
Wheat	1,425·0	1,234·05	—	22·98	19·90	—	2·03	1·76
Barley	570·0	485·07	—	9·19	7·82	—	·81	·69
Peas	285·0	245·10	—	4·59	3·95	—	·41	·35
Meatmeal	142·5	127·11	—	2·29	2·05	—	·20	·18
Total	2,422·50	2,091·33	62	39·05	33·72	700	3·45	2·98
Mean per Pig	403·75	348·55	—	6·51	5·62	116·66	—	—

In addition, pigs allowed daily grazing on rye grass.

SUMMARY OF FEEDING.

	Quantity of Food Consumed Per Pig.		Days Fed.	Quantity of Food Consumed Per Pig Per Day.		Total Increase Per Pig.	Quantity of Food Per Lb. of Increase.	
	Bulk.	Dry Matter.		Bulk.	Dry Matter.		Bulk.	Dry Matter.
	Lbs.	Lbs.	Days.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.
			GROUP I.					
Large White x Tamworth x Barkshire (old type) .	657·18	445·23	96·33	6·81	4·61	139·50	4·70	3·19
Large White x Berkshire (old type)	706·31	476·94	88·66	7·96	5·37	134·50	5·16	3·51
Tamworth x Berkshire (old type)	616·31	396·65	98·66	6·24	4·05	120·66	5·09	3·30
			GROUP III.					
Tamworth x Mid York...	582·76	299·43	86·00	6·77	3·48	105·66	5·50	2·81
Canadian Berkshire x Mid York	625·41	328·54	86·00	7·27	3·82	108·50	5·76	3·04
Large White x Berkshire (Canadian x old type) .	589·75	303·39	86·00	6·86	3·54	112·83	5·22	2·69
Canadian Berkshire x Large Black	656·90	320·67	75·00	8·75	4·27	126·20	5·19	2·53
			GROUP II.					
Tamworth x Large Black	403·75	348·55	62·00	6·51	5·62	116·66	3·45	2·98

Table II. shows the total amount of food fed the different crosses in order to bring about the increases recorded; it also discloses the average quantity of food consumed per pig per day, and the amount required to produce one pound of increase.

Owing to the composition of different rations used, all foods are referred to as "dry matter" when making comparisons.

The economy of food consumption plays a very important part, and in this trial it will be seen that the amount of food consumed per day, and the quantity required to produce one pound of increase varies considerably in the feeding of the different crosses.

Here again, the different rations fed have influenced to some extent the economy of feeding, for the pigs in the third group, which were fed a continuous ration of wheat, barley, and peas, in the proportion of 5, 2, and 1 respectively, supplemented with meatmeal and skim milk, required considerably less food for development than the pigs of the first group, which were fed mainly barley and wheat, supplemented at different periods by crushed peas, meatmeal, skim milk, or lucerne, a ration that depended on the addition or removal of supplementary foods according to whether they were available or not.

The Table also demonstrates that the pigs of group III. made better use of their food, by greatly reducing the average quantity necessary to create one pound of increase, than was the case with pigs fed in the first group, the amounts being respectively 2.77lbs. against 3.33lbs., an outstanding reduction.

In the feeding of the Tamworth-Large Black cross, it is not possible to make a true comparison with other groups, as the figures refer only to the grain portion of the ration, no adjustments being made for the amount of green fodder consumed while these pigs were grazing, which, undoubtedly, influenced the rate of maturity, and if taken into consideration would increase the amount of "dry matter" necessary to produce a pound of increase.

As far as the trial has gone, the following deductions have been possible:—

The carcasses of all pigs, representing eight different crosses, that have been sent overseas for criticism have in a general way been accepted as suitable for export, but from the reports of Mr. McCann and Mr. Whitney, the suggestion is an absence of uniformity of type, which, if it were possible to have sent all carcasses as a single shipment, it would have provided a rather unattractive consignment.

The CANADIAN BERKSHIRE BOAR, which was the sire used in the breeding of two of the crosses referred to in this article:—Canadian Berkshire x Mid. York; and Canadian Berkshire x Large Black.

The trial has provided the South Australian pig raiser with some material for serious thought, and it is evident that in our endeavour to produce a uniform type, that will compete successfully with other countries which are at present supplying Great Britain with pork and bacon carcasses in large quantities, we will have to limit our breeding to those breeds that definitely show the desired conformation, and eliminate as far as possible the breeds and crosses that develop characteristics which are detrimental to the well-being of the industry.

Here again we can quote from Mr. McCann's report:—"With the Large White, Tamworth and Canadian Berkshire available for crossing or even straight breeding, South Australia should not have any difficulty in producing carcasses in large numbers that will meet the demands of the United Kingdom trade."

Breed alone is insufficient, type within the breed is the important factor, the selection of a strain that is capable of producing pigs in large numbers, uniform in conformation, and complying with present-day market classes is the surest way to success.

Criticism has also brought to light the necessity of introducing singeing in the case of black-haired and dark-skinned pigs. No matter how well scalding has been carried out it is impossible to make them as attractive as those that do not show any pigmentation. The question of colour is important, for in order to attract British buyers the carcass must be clean, well dehaired and white finished as possible.

With reference to feeding, the trial has demonstrated that to provide a finished carcass carrying a high proportion of lean meat, the animal should be fed, in addition to a grain mixture, supplementary foods that are comparatively rich in protein. The use of skim milk, meatmeal, and if possible some green fodder, not only encourages the production of lean meat, but reduces considerably the amount of "dry matter" necessary to create one pound of increase.

Exercise and green feed have been shown to be essential factors in the development of the bacon carcasses. This is clearly demonstrated in the case of the Tamworth-Large Black group which were allowed approximately four hours daily grazing on rye grass. In addition to showing the greatest daily increase the condition of the carcasses was criticised as being "just about right". Close sty feeding with limited exercise was apt to encourage the development of fat rather than that of lean meat.

In conclusion, it should be pointed out that to complete this trial, pigs of different pure breeds would have to be taken into consideration, together with further combinations, but these should be confined to those breeds that are recognised throughout Australia as being suitable for the production of a bacon carcass.

Tubercle Free Herd Scheme.

The following herds have been tested and comply with the conditions laid down by the Tubercle-Free Scheme, whereby stud-owners may apply to have their herds tested, free of charge, by the Stock and Brands Department:-

Owner and Address.	No. of Cattle.	Expiry Date.
1. J. H. Dawkins, Para Wirra Jersey Stud	25	16/4/38
2. W. Hawker, Anama Friesian Stud, Central Bungaree, *via* Brinkworth	37	25/11/39
3. O. H. Woodward, Marama Jersey Stud, Gilles Plains	22	2/11/38
4. G. L. Hampton, Cloverdale Illawarra Shorthorn Stud, Echunga	25	12/8/39
5. J. M. Bray, Sweethaven Jersey Stud, Langhorne's Creek	26	19/8/39
6. Kybybolite Experimental Farm, Kybybolite	88	1/9/39
7. A. Kelly, Milang	38	21/10/39
8. Agricultural College, Roseworthy	70	9/11/39
9. Mr. E. F. Schulz, Eden Valley	30	16/12/39

Production and Meat Exports.

The production of butter and cheese for September, 1937, was:—Butter, 2,182,306lbs.; cheese, 1,430,697lbs.; for October was:—Butter, 2,662,666lbs.; cheese, 2,179,467lbs.

Meat exports (figures taken from statistics supplied by the Australian Meat Board)—

	Total Australian Exports, July-October, 1937. Carcasses.	
Mutton	168,933	(S. Aus., 43)
Lamb	1,447,746	(S. Aus., 218,414)
Pigs (porkers and baconers)	68,770	(S. Aus., 653)
		Cwts.
Chilled beef	211,359	(S. Aus., nil)
Frozen beef and veal	936,245	(S. Aus., 475)

The Removal of Spray Residue from Apples

[By R. Fowler, Manager, Government Experiment Orchard, Blackwood.]

Experiments Carried Out at Blackwood, 1936-37

It was demonstrated in the 1935-36 experiments that the percentage of mouldy core, due to acid entry into varieties prone to the development of open calyx tubes, was definitely reduced by shallow immersion.

It was, therefore, decided to test, in conjunction with another series of deep and shallow immersion tests, a flotation system, using a washing machine built according to plans and specifications developed in the United States.

Description of Experiments.

Cleopatra apples were used in all the experiments taken from experimental plots sprayed with the following schedules:—

(1) 5 Arsenate of lead* sprays — 4lbs. to 100 gallons.
(2) 2 Arsenate of lead sprays—4lbs. to 100 gallons followed by 3 sprays lead arsenate, 2lbs. combined with ¾ gallon white oil per 100 gallons of water.
(3) 5 Arsenate of lead sprays—6lbs. to 100 gallons.
(4) 2 Arsenate of lead sprays—6lbs. to 100 gallons; 2 sprays 4lbs. to 100 gallons, and 1 spray 3lbs. arsenate of lead combined with red oil (¼ gallon to 100 gallons).

The last sprays were applied on 2nd February; the fruit was harvested on 8th March, and dipped on 12th March.

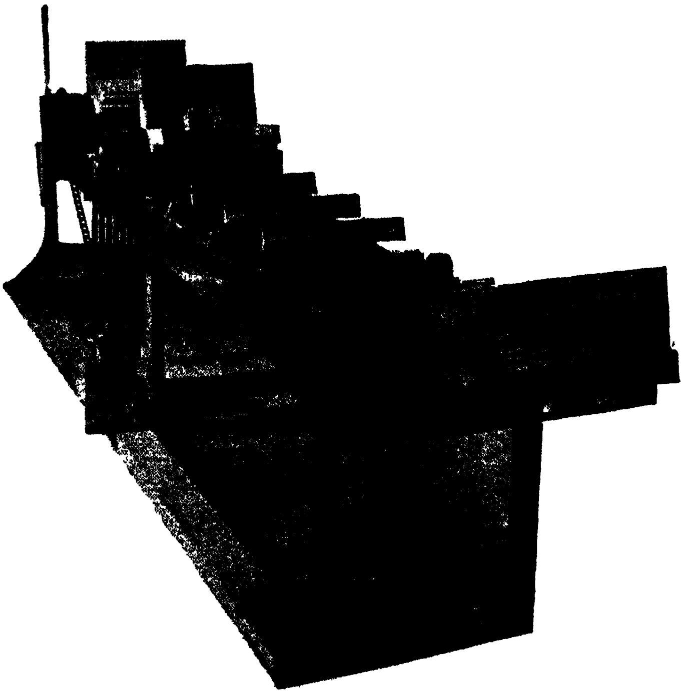
Washing Solutions.

The following solutions were included in the tests:—

(1) Hydrochloric acid 1 per cent. followed by immersion in lime water.

(2) Hydrochloric acid 3 per cent. followed by immersion in lime water.

(3) Sodium silicate (waterglass) 8 per cent. (by weight).



Apple Washing Machine, flotation type.

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*Powder in all schedules.

Equipment.

A full description of the trough system of dipping—with illustrations of various designs of trough—is given in Department of Agriculture Bulletin 319, procurable on application, and need not be repeated in this article. The apple-washing machine illustrated herein was, however, used for the first time in 1936-37, and a brief description of this method of removing arsenical residue may be of interest.

The machine was manufactured in South Australia from plans and specifications as previously stated, taken from a United States Bulletin on the "Removal of Arsenical Spray Residue," and supplied by the Department of Agriculture.

The machine is not large or very expensive, and is simple in design. It is more adapted to the use of individual growers than large co-operative packing sheds, as the capacity per hour is not more than 40—60 c/s, the rate at which it can be driven being governed by the period of immersion of fruit necessary in the acid bath, usually not less than one minute. The motive power may be provided by a ¼ h.p. electric motor, a small oil or petrol engine, or even by hand, but as the immersion period should be fairly constant, hand working is not altogether desirable. A moderate supply of water is necessary.

The fruit in a kerosene or dump case is placed in a tipping device from which it is slowly drawn on to a canvas conveyor to the acid bath, through which it floats on the surface of the washing solution, being drawn through the vat at a constant speed by a system of horizontal paddles.

It is then lifted by the first paddle wheel out of the acid bath and into the lime rinsing solution, and by the second on to a draining-board where it is rinsed again under a number of sprays of clear water directed downwards. The fruit finally runs into a receiving case which is held in a frame at an angle regulated by a compensating weight, which allows the apples to run rather than fall into the case, and so prevents unnecessary bruising.

This flotation principle is particularly desirable in the case of apples like Cleopatra, London Pippin, Delicious and other open calyx-tubed varieties which have previously developed a high percentage of mouldy core, induced by acid entry when immersed in acid solutions in the ordinary dipping bath.

Method of Sampling for Determination of Arsenical Residue on Fruit.

Representative samples were obtained by taking eight fruits of even grade from five different cases, giving 40 fruits. These fruits were passed through the washing machine, remaining approximately one minute in the solution, then after immersion in the lime wash, they were thoroughly rinsed in fresh water, and allowed to dry.

Every second fruit was then discarded, thus achieving a sample of 20 fruits; these were forwarded to the Department of Chemistry with a request that every second fruit be discarded again and an analysis carried out on the remaining ten fruits.

The relative efficiency of the acid and sodium silicate solutions on the arsenical residue from the various spray schedules is indicated in Table 1.

TABLE I.—*Analysis of Washed and Unwashed Fruit.*

Spray Schedule.	Variety.	Grains of As_2O_3 per lb. of Fruit.			
		Not Washed.	Washed in 1% HCl. and Rinsed in Lime Water.	Washed in 3% HCl. and Rinsed in Lime Water.	Washed in 8% Sodium Silicate.
1. 5L, 4lbs.	Cleopatra	·0099	·003	·002	·004
2. 2L and 3L and O	Cleopatra	·011	·004	·004	·010
3. 5L, 6lbs.	Cleopatra	·026	·013	·004	·012
4. 2L, 6lbs.; 2L, 4lbs.; 1L, 3lbs. and ¼gall. R.O.	Cleopatra	·012	·003	·003	·003

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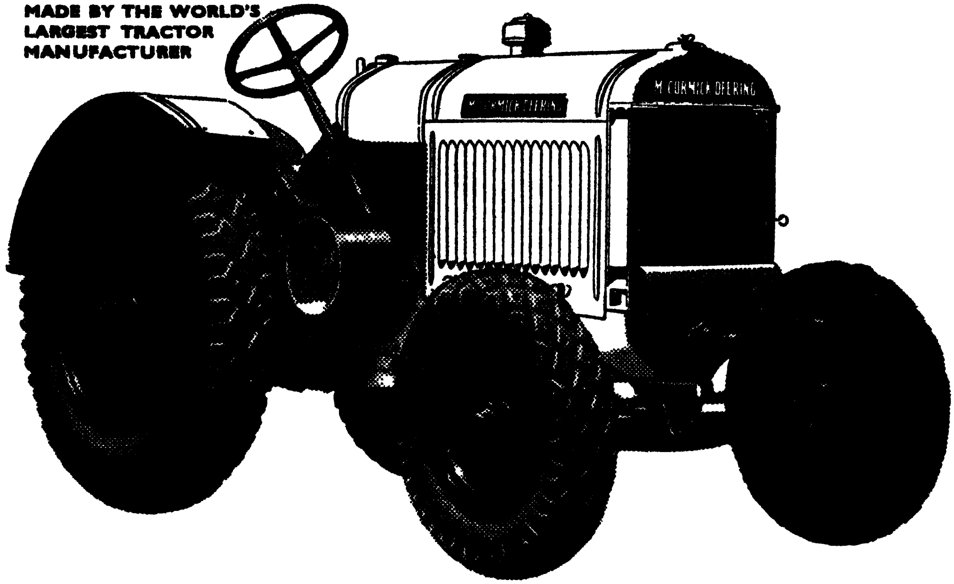

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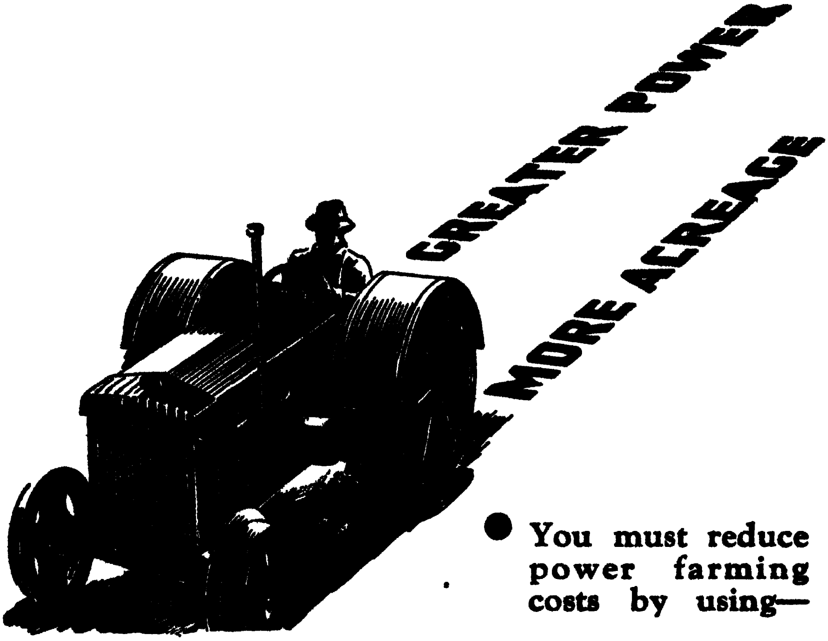

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An examination of the figures indicates that the arsenical residue was in no instance very high. Heavy rains were experienced during January (3.20 in.), resulting in a probable loss of accumulated arsenical spray on the fruit, and preventing the application of a cover spray during that period, thus foreshortening the spray schedule. Both concentrations of hydrochloric acid were effective in reducing the arsenical residue, but sodium silicate was not so consistently effective.

It should, perhaps, be pointed out, that in the process of picking, sampling, washing and analysing, the samples were handled seven or eight times, so that the arsenical residue stated as remaining on the unwashed sample is hardly indicative of that on the fruit packed and handled in a commercial manner.

Effect of Machine Washing Treatment on Keeping Quality.

In order to determine the effect of the various washing treatments on keeping quality, four lots of five cases each of fruit from Schedule 1 were treated in the washing solutions (previously mentioned), in the washing machine. Three of these lots were treated respectively in the three solutions, immersed in lime water and finally rinsed thoroughly in fresh water; one lot was not treated. The fruit was placed in cold storage, and at fortnightly intervals, extending over a period of ten weeks, one case from each treatment was removed, held in ordinary storage for one week, and then examined for skin injury, calyx injury, mouldy core, and other disorders. The detailed results for each examination are shown in Table II.

TABLE II.—*Machine Washing Tests—Detailed Results of Examinations.*

Test Treatment.	Incidence of Mouldy Core when Examined on—					Percentage of Mouldy Core over Storage Period.
	6/4/37.	20/4/37.	4/5/37.	18/5/37.	1/6/37.	
	%	%	%	%	%	%
Exp.—						
1. HCl., 1%	—	·88	—	2·55	·66	1
2. HCl., 3%	9·62	—	·73	4·66	2·00	2·5
3. Na Sil. 8%	—	—	·73	—	—	·18
4. Unwashed	—	—	—	—	—	—

A study of these results seems to indicate that the development of mouldy core, due to penetration of the acid solution, develops fairly rapidly, and apples so affected show evidence of the disease within a short time after storage. The results are summarised in Table III.

TABLE III.—*Summary of Machine Washing Tests.*

Period of Storage.	Variety.	Mean Percentage of Fruit Affected with Mouldy Core During Period of Storage.			
		Not Washed.	Washed in 1% HCl. and Rinsed in Lime Water.	Washed in 3% HCl. and Rinsed in Lime Water.	Washed in 8% Sodium Silicate.
10 weeks	Cleopatra	—	% 1	% 2·55	% ·18

From Tables II. and III. it will be seen that it is comparatively safe to use a 1 per cent. hydrochloric acid wash on open calyx-tubed apple varieties, like Cleopatra when floated through a washing machine, and that there is little adverse effect on the keeping quality of the fruit. However, when 3 per cent. solutions of hydrochloric acid have to be used, the losses increase, and there appears to be an element of risk with this type of fruit. This is indicated by the fact that mould losses, in one individual case, up to 9.62 per cent. resulted from this treatment.

A close examination of fruits affected by mouldy core was made to determine whether abnormal apples, commonly spoken of as "bull nosed," were more liable to infection than the normal type of fruit. Of 104 fruits so examined, 52 were found to be of normal type and 52 abnormal. The season being an "off" one, the percentage of bull nosed fruits was much higher than would have been the case in a normal season. The figures, therefore, would seem to indicate that the liability to infection by mould spores and penetration of acid solutions, is due to the natural formation of the calyx tube in this type of fruit, not altogether to any abnormal development of the fruit itself.

Dipping Trials.

A similar quantity of Cleopatra apples was treated by the "dipping" method, and stored and recorded in the same manner.

Table IV. gives results in detail, and in Table V. the same results are summarised.

TABLE IV.—*Dipping Tests—Detailed Results of Examinations.*

Test Treatment.	Incidence of Mouldy Core when Examined on—					Percentage of Mouldy Core over Storage Period.
	6/4/37.	20/4/37.	4/5/37	18/5/37.	1/6/37.	
	%	%	%	%	%	%
Exp. II.—						
1. HCl. 1% D. Lime washed	—	1·77	9·73	9·73	2·65	5·47
2. HCl. 1% S. Lime washed	1·15	·88	—	1·77	2·65	1·22
3. HCl. 3% S. Lime washed	2·77	3·18	4·00	6·19	6·19	4·45
4. HCl. 1% S. Fresh water washed	—	1·46	1·46	1·46	8·80	2·66

TABLE V.—*Summary of Tests Immersed in Dipping Bath.*

Period of Storage.	Variety.	Mean Percentage of Fruit Affected with Mouldy Core During Storage Period.				
		Not Dipped.	Dipped in 1% HCl. and Rinsed in Lime Water. Deeply Immersed.	Dipped in 1% HCl. and Rinsed in Lime Water. Shallow Immersion.	Dipped in 3% HCl. and Rinsed in Lime Water. Shallow Immersion.	Dipped in 1% HCl. and Rinsed in Fresh Water. Shallow Immersion.
10 weeks	Cleopatra .	—	% 5·47	% 1·22	% 4·45	% 2·66

From Table VI. it emerges that the flotation principle adopted in the washing machine is quite an effective method of removing arsenical residue, dilute hydrochloric acid solutions giving somewhat better results than shallow dipping in regard to storage troubles.

In these dipping tests, very careful control was maintained over the depth to which the fruit was immersed in the acid

TABLE VI.—*Comparison of Results—Machine Washing* v. *Dipping.*

Treatment.	Machine Washing.			Dipping—Shallow Immersion.		
	Highest Percentage of Loss per Case Due to Mouldy Core.	Lowest Percentage of Loss per Case.	Mean Over Period 10 weeks Storage.	Highest Percentage of Loss per Case Due to Mouldy Core.	Lowest Percentage of Loss per Case.	Mean Over Period 10 Weeks Storage.
	%	%	%	%	%	%
Washed in HCl., 1% and rinsed in lime water ...	2·55	·66	1	2·65	—	1·22
Washed in HCl. 3% and rinsed in lime water ...	9·62	·73	2·5	6·19	2·77	4·45

solution. The apples were first transferred from the picking-boxes into long bushel cases 6in. deep, and then submerged just below the surface of the solution, and moved slightly from side to side without any downward pressure. If dipped by the bushel case in a deep bath, very serious losses may result when treating open calyx tubed varieties. This is evident from the figures in Table V.

Even under these controlled conditions it will be noted that appreciable losses from mouldy core occurred.

Where a grower is dealing with large commercial quantities of fruit, it is obviously more difficult to exercise the same control over depth of immersion in the acid solution. For instance, if a bushel case were used for dipping, and the depth of immersion exceeded appreciably six inches, the losses from mouldy core in Cleopatra may be much higher than those occurring in this experiment.

Dipping in hydrochloric acid for residue removal may be regarded as comparatively safe for varieties, such as Jonathan or Rome Beauty; for the Cleopatra, however, most stringent control of depth of immersion is essential, and in certain seasons losses may still occur, even with most stringent control.

It is also evident that open calyx-tubed apples cannot with safety be deep dipped in 1 per cent. hydrochloric acid or shallow dipped in 3 per cent. hydrochloric solution, even when the acid wash is followed by immersion in lime water. After shallow dipping in 1 per cent. acid solution, immersion in lime water has given only slightly better results than immersion in fresh water.

During storage, the fruit from all treatments showed few blemishes other than mouldy core for the first six weeks, then storage pit developed to a rather considerable extent. There was no evidence that the various treatments had any bearing on the incidence of this defect.

Goodwill Tour of New Zealand.

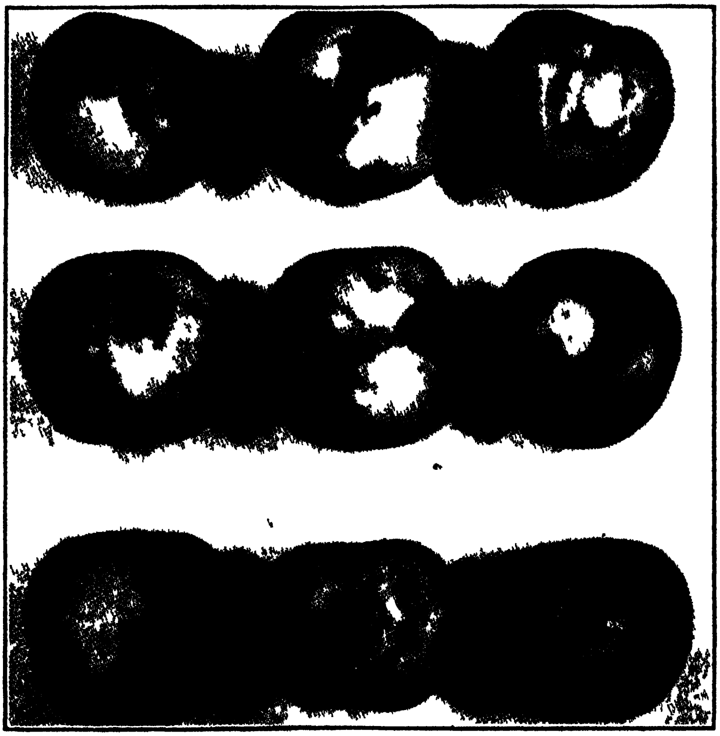
The itinerary of the third annual Goodwill Tour to New Zealand by South Australian Primary Producers, their wives and friends, has been carefully planned to include the best agricultural, pastoral, and scenic features of the Dominion, such as Agricultural Colleges, Stud Farms, Alpine Resorts, Glaciers, Thermal Regions, and Cities.

The tour will commence on 31st January and in New Zealand it will be personally conducted by an expert officer of the New Zealand Government Tourist Department. A syllabus quoting conditions of travelling, fares, the individual districts and places which will be visited, &c., may be obtained on application to the South Australian Government Publicity and Tourist Bureau, King William Street, Adelaide.

Apple Export

[By Officers of the Horticultural Branch of the Department of Agriculture, Adelaide.]

The domestic market for South Australian apples, although undoubtedly capable of appreciable expansion, is at the present time comparatively restricted, and it is customary to export a considerable proportion of our annual apple production.

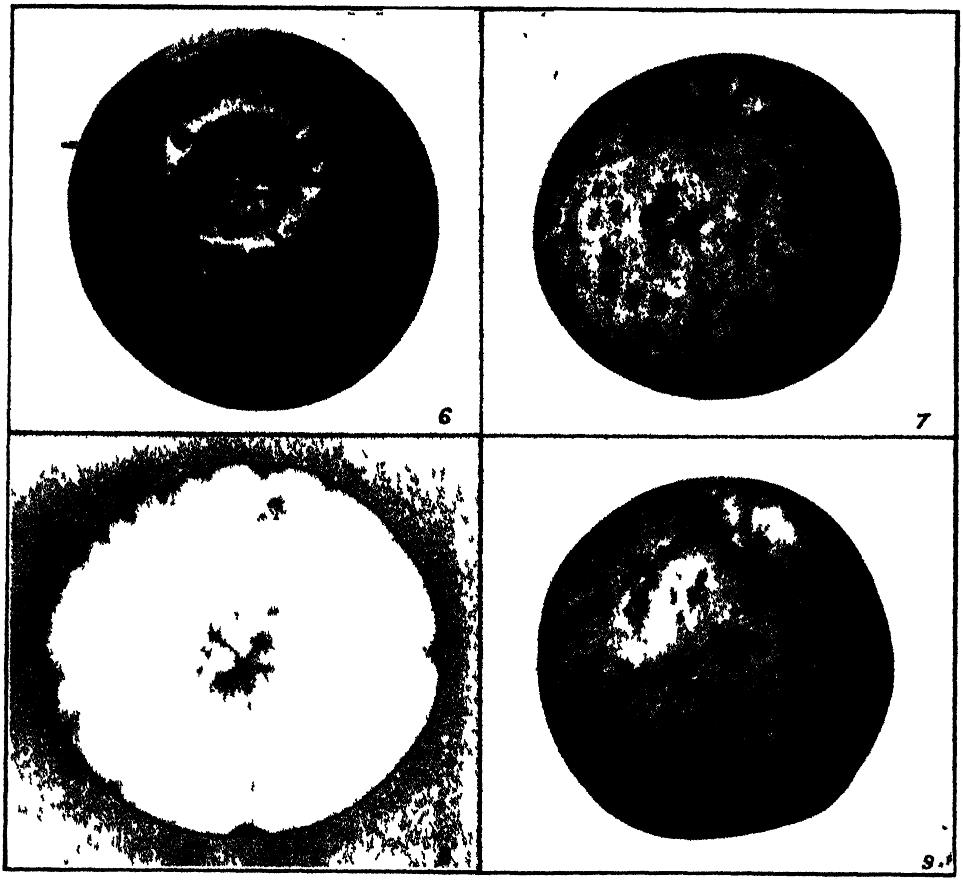


Superficial scald on Rome Beauty
(From Iowa Bulletin 329)

Generally speaking, overseas receivers of South Australian apples regard the packing and quality of our fruit as reasonably good, but neither receivers on the other side of the world nor those connected with the industry in this State will deny that there is much room for improvement of many individual consignments.

Improvement in the actual packing of the fruit is of obvious importance, but perhaps less obvious is the necessity for more attention on the part of growers and packers to the selection of export fruit. It is a matter for regret that each year a varying proportion of apples submitted for export constitutes "borderline" fruit—fruit which would be better retained for supply of local markets to the ultimate benefit of both overseas and domestic returns. There is no necessity to labour this point in connection with fruit which tends to be unattractive on account of slightly too much blemish, or slightly too little red colour—the desirability of excluding such fruit from the export pack should be apparent to all.

Quite apart from the above considerations of blemish or colour, it is recognized that much fruit of attractive appearance, but of poor travelling quality is packed and submitted for export inspection each season. Apples which tend to be immature or too forward, and apples from light cropped trees are instances of fruit which should not be prepared for export; such fruit constitutes a risky export, and is just the kind of fruit which is required for domestic markets, *i.e.*, fruit which is not capable of showing best out-turn in United Kingdom, but which is of good appearance and high quality for successful short-range marketing within the State.



Bitter Pit.

(From "Bitter Pit Investigation," D. McAlpine.)

Admittedly, doubtful fruit of the type referred to in the preceding paragraph does not constitute a large proportion of our total export, and much is rejected at the time of inspection; on the other hand, it is not always possible for inspectors to identify at the time of inspection inherently defective fruit, such as for example, fruit from very light cropped trees. In this matter, the grower and packer carry heavy responsibility, and a better realisation of this responsibility would help to eliminate almost entirely those odd lines of fruit which occasionally arrive at their overseas destination in an indifferent condition; furthermore, the retention of such fruit in South Australia, and its release on local markets would tend to invigorate a domestic trade which is capable of considerable expansion.

Picking Maturity.

The fruit sent overseas must reach the retail consumer in the full perfection of ripeness. This means that the fruit must be harvested before it is ripe, but it must also be allowed to develop so far that it is capable of completing its maturation processes without further assistance from the tree. There is probably no more difficult question to answer than "When is an apple ripe enough to pick for export?"; and there is probably no other single factor which has so far reaching an effect on successful carriage of the fruit.

The maturity of the apple controls the storage life, and the manner in which the fruit will "ripen up". On these depend the quality of the fruit as it reaches the retail consumer; further, it is the maturity which controls the appearance of most of the diseases which cause wastage in our exported apples. This wastage is not only a source of direct loss, it tends also to lower values of successful shipments.

Our apples must travel half way across the world, and after arrival, must be in a fit state to stand lengthy keeping in common store. It is, therefore, essential that they leave our ports with the highest possible potential storage life. In addition, the maturity must be such as to minimise the danger of wastage from storage disorders.

Considerable experience is necessary to assess the correct picking stage. The characters of each variety must be taken into consideration. The task is difficult, but closer attention will be amply repaid.

Immaturity.

Unfortunately, it is almost impossible to pick an apple of exportable size, green enough to prevent it ripening after a fashion. Many growers tend to commence picking too early, although it is recognised that the necessity of fulfilling early shipping commitments often makes it difficult to pick at optimum maturity. An apple picked before it is sufficiently mature may ripen up, but will invariably be of inferior quality; it will not soften properly, tends to shrivel, may not develop its full sweetness, and may tend to bitterness. Admittedly, an apple must be picked at a very early stage for all these faults to appear to the full extent, but they do appear in some measure in all too early picked fruit, and reduce the quality to a degree.

Bitter Pit.

Much of the spoilage in export shipments of apples arises from the incorrect gauging of maturity at picking, and other factors which influence the final degree of maturity of the fruit at shipment. Immaturity in susceptible varieties tends to increase wastage from bitter pit and superficial scald. The liability of early shipments to develop bitter pit is illustrated in Figure, early shipments, for which there is a tendency to pick too soon showing a much greater proportion of loss from this cause.

Overmaturity.

On the other hand, over-maturity, arising from late picking or unfavourable holding conditions before shipment has influence on the development of internal breakdown and soft scald, and greatly increases the loss from bruising and the conicomitant fungal rotting. After discharge from the hold at an overseas destination fruit may be held in the warehouse and in transit for up to thirty days, before the cases are opened. What may happen during this period is shown in the following Table:—

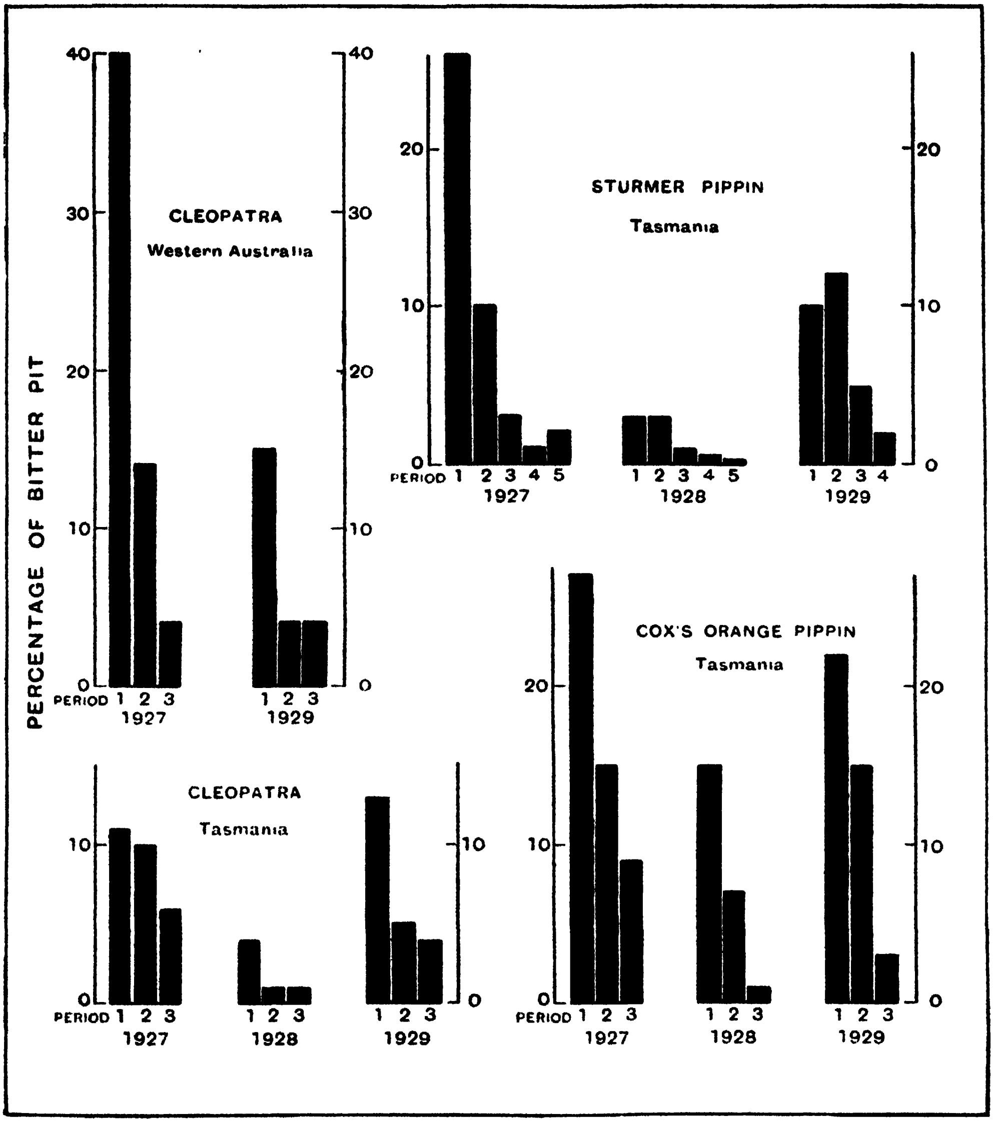
Days after Discharge.	Rotting per cent.	
	Ripe.	Less Ripe.
2	5.0	2.8
16	13.0	4.4
30	18.0	8.3

NOTE.—Data for this Table were taken from representative cases of fruit collected at the London Docks.

Apart from obvious spoilage, there is the fact that over-mature fruit, although apparently sound, is far past its best in regard to flavour and palatability.

The London market prefers a hard green apple, especially in the case of early varieties. Predominance of yellow in the ground colour vastly reduces values, as buyers have found from experience that these short-lived types, when yellowed, will often be unusable by the time they reach the consumer. The fruit must appear on the wholesale market before full yellow colour develops, but without the faults arising from immaturity at picking. It is only with the late, long-keeping varieties that yellow ground colour is tolerated, and even in this case, such colour discounts values.

PERCENTAGE OF BITTER PIT OBSERVED DURING SUCCESSIVE PERIODS IN SHIPPING SEASON.



(Courtesy Empire Marketing Board.)

Maturity Indicators.

There are many indicators of approaching ripeness which may be used in gauging the correct picking maturity of the apple. Several of these are detailed below, but it will be seen that all of them are subject to seasonal influences, and will vary in exactitude. A satisfactory decision, therefore, can only be made by utilising a number of these maturity gauges in conjunction, and above all by using them with common-sense and discretion.

Size of Fruit and Windfalls.

As picking time comes nearer, several points are noticed automatically; viz., the size of the fruit, and the occurrence of the first appreciable drop of windfalls. The grower's experience will allow him to give these their true significance.

Ground Colour.

The most nearly exact and reliable maturity guide for the use of the grower is the first appearance of yellow in the ground colour of the fruit. By ground colour is meant the colour of that part of the fruit which becomes yellow when fully ripened, *i.e.*, the "unblushed" part of the fruit, and of this part, those areas between the breathing pores which are covered by unbroken skin. Only the shaded side of the fruit should be considered, as in this part there is little risk of sun bleaching giving a false impression of ripeness.

The ground colour of the fruit owes its tint to two separate pigments, the green, which disappears, and the yellow, which appears and strengthens as ripeness approaches. It is the first appearance of this yellow pigment which indicates that the fruit is ready for export picking. In the coloured varieties, a change will be noticed in the tint of the red portions about the same time. The blush loses the dull rusty appearance of the immature fruit, and brightens and strengthens towards the full scarlet of the ripe apple. This latter change is not a very sensitive indicator, but it must be watched, nevertheless, in connection with the colour requirements of the export grades of coloured varieties.

Charts to gauge the green to yellow ground colour changes have been prepared from time to time, but it has proved very difficult to obtain a chart capable of straight forward use. The tint of green varies with the variety, the season, and the district, so that, although this colour change is the most reliable guide, it must be used with care, and always in conjunction with other tests.

Pip Colour and Stem Break.

As the seeds or pips mature, they change colour from the white of the immature apple to dark brown. At the same time, the tree commences to form a layer of bark tissue between the fruit stem and the spur, so that the fruit comes away from the branch very easily when lifted. Colouring of pips and ease of plucking are both signs that the fruit has finished development and is ready to pick; but both are subject to disturbance by climatic conditions. A dry spell tends to hasten seed maturity and induces a false impression as to the maturity of the fruit as a whole. Freedom of picking is similarly open to misconstruction, and should be used as a rough guide only.

Internal breakdown of Jonathan, arising from over-maturity.
(From Iowa Exp. Stn. Bulletin 329).

Darkening of Flesh.

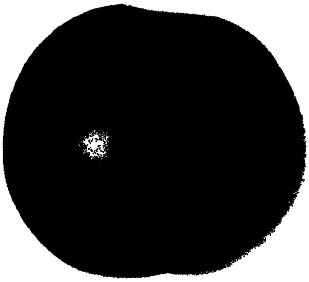
Another indication of ripeness is given by the time taken for the white flesh to turn brown after cutting and exposure to air. The more mature the fruit, the longer it takes to darken.

Iodine Test.

The iodine test measures the progress of the change of starch; as the fruit ripens, the starch stored within the cells is converted to sugar. To make this test, the fruit is cut across, and the cut surface, dipped into or painted with a solution of iodine made up to the formula:—

Water—100 parts.
Pot. Iodide—1 part.
Iodine Crystals—0.25 parts.

Any starch present in the cut cells is stained a deep inky blue. The appearance of light patches indicates that in these areas the starch has been converted and that the fruit is approaching maturity. Although this iodine test measures one of the fundamental processes of ripening, it must again be used with caution; some varieties are notable for uneven ripening, the conversion of starch commencing in some parts of the fruit before others are nearly mature. Again, the weather conditions at harvest may also affect the change on which this test is based. It cannot, therefore, be entirely relied upon.



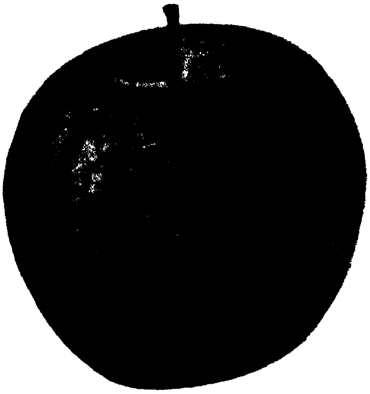
Soft Scald.
(Courtesy U.S. Dept. of Agriculture.)

Flavour Texture.

Finally, the colour, texture, and flavour of the flesh change as the fruit ripens. The sweetness of sugars appear, and the dense woodiness of the green fruit changes to the crisp juiciness of approaching ripeness. The first appearance of this change indicates that the fruit is ready for picking.

Reliability.

The reason that we have no exact gauge to maturity is that, as stated before, ripening is not one single process. Each guide measures only one, or perhaps a group of the many changes taking place, and the exact progress of these individual changes can be altered by the environment in which the tree is growing. It is from this adaptability that the hardiness of the apple tree arises, but it is also the reason why all maturity tests must be interpreted with great caution. The change in ground colour and the darkening of the pips are among the most reliable as they indicate the progress of several changes instead of one particular change. They are best suited for growers' use, but should be supplemented with other observations, and above all, with the grower's experience. If the grower is still in doubt, he should ask the advice of his District Horticultural Adviser.



Soft scald on Rome Beauty, a disease associated with over-maturity.
(Courtesy U.S Dept. of Agriculture.)

Do Smutted Wheat Heads Flower?

Replying to the above question which was asked by the Willowie Branch of the Agricultural Bureau, Mr. W. J. Spafford (Director of Agriculture), says:—"When wheat plants are affected with stinking smut or bunt, they do not flower, because the whole of the organs of reproduction are not replaced by the spores of the fungus before the heads are freed from the sheaths.

In the soil, the spores of bunt which are placed there with the seed wheat germinate at the same time as the grain, send threads into the young wheat plant, and these threads grow up between the tissues throughout the growing period of the plant, and produce a fresh crop of spores in the part of the head that would have normally held the grain. This fructification of the bunt plant takes place long before the flowering organs of the wheat can reach the light of day, and so no flowering takes place."

Notes on the Cold Dip for Sultanas

(Issued by the Dried Fruits Processing Committee).*

General.

The introduction of fine proprietary emulsions, in place of home-made emulsions prepared from olive oil on the growers' premises, has simplified the preparation and the use of the cold dip. The chief advantages are that proprietary emulsions are more uniform and more stable. They are much easier and safer to use, because in the preparation of the dip the grower is less dependent on his judgment. In reference to quality, there is usually no noticeable difference in grade, if home made emulsions are made with good quality olive oil.

Preparation of the Cold Dip.

The cold dip is a solution of potassium carbonate (Potash) to which an emulsion of olive oil has been added. The usual concentration is 1lb. of potassium carbonate to 2 gallons of water. The proprietary emulsions on the market last year were used at a strength of 4 pints of emulsion to 50 gallons of potash solution. This gave similar results, in drying rate and quality, to the home-made emulsions containing 1½ pints of oil. The finely divided proprietary emulsions have been available for only a few years, and are still in the transition stage. Variation in the principal ingredients, oil, emulsifying agents, and wetting agents, may in the future be accompanied by altered recommendations in regard to the quantity incorporated in the dip. The use of the prepared emulsions are generally favoured in the "cold dip" districts, and they represent a very useful refinement in dipping practice.

Concentration of the Potash.

Reduced quantities of potash are favoured by some growers. The full strength (1lb. to 2 gallons) usually results in slight burning at the points of the berries. A reduction to 1lb. to 3 gallons prevents most of this burning. The lower concentration reduces the drying rate, and is recommended only in cases of ample rack space. If the growers' circumstances are such that a "hold up" is likely while awaiting rack space, the full strength potash, accompanied by spraying in fine weather, is useful in securing quicker drying. Under normal circumstances, with ample rack space, spraying is undesirable unless the fruit has been affected by rain. Otherwise it tends to darken the fruit.

Most of the objections to cold dip are based on its slower drying rate in good drying weather as compared with the mixed dip. In wet or humid weather, the drying rate is retarded in all cases, but to a lesser extent if the grapes have been cold-dipped.

Notes on Finishing-off Sultanas after Cold Dip.

The fruit should be well dried on removal from the rack, in order to avoid blobbing of soft berries. Removal from the rack is best carried out in early morning, and the fruit needs a full day in the sun before washing. Washing should be carried out in the morning after one day's exposure in good weather. Thin spreading as soon as possible after washing is essential. Where oil is incorporated in the wash, an improvement in grade frequently results. Two pints of proprietary emulsion, or 1½ pints of approved quality "white oil", with ½lb. to 1lb. of potash per 50 gallons of water, make a satisfactory wash.

Comparison of Quality of the Fruit.

In the grade of fruit produced, and in keeping qualities, the cold dip has consistently proved superior to other dips in all comparisons during the last ten years. The mixed dip has been favoured in some districts, and by some growers, because it is cheaper, dried more quickly in normal dry weather, and does not require so much care in bleaching and "finishing-off."

Keeping Qualities.

Various storage trials have shown that fruit from the mixed dip darkens much more than that from the cold dip. For this reason, cold-dipped and mixed-dipped fruit should not be blended. The fruit may appear similar at the time of packing, but subsequently the mixed-dip portion will darken, giving an undesirable blend of light and dark berries. For the cold-dip particularly, washing and ample exposure to the sun on hessians is absolutely necessary after removal from the rack. Otherwise an undesirable green tinge, and change of colour after packing, may be featured.

Recommended Procedure for the Cold Dip.

(For preparation in a stock pot or direct in the dip tank.)

1. Prepare the potassium carbonate solution at a concentration of 1lb. of potash to 2 gallons of water. (See note above on lower concentrations.)
2. Add the prepared emulsions at recommended strength.
3. The period of immersion in practice varies from two to four minutes, according to the effects of the dip on the grapes, the concentration, and the temperature. The period of immersion may be further decreased by special wetting agents.
4. Make all necessary additions to the dip tank at similar strength to the dip prepared as above.
5. Thin spreading, thorough drying on the rack and complete finishing-off on hessians are essential for best results.
6. In districts where oil (paraffin) is subsequently added in the packing house, no oil is necessary in the wash.

* The members of the Fruit Processing Committee are:—

Mr. W. R. Jewell, Agricultural Research Chemist, Department of Agriculture, Victoria (Chairman).

Mr. A. V. Lyon, Commonwealth Research Station, Merbein.

Mr. C. G. Savage, Director of Fruit Culture, New South Wales.

Mr. A. G. Strickland, Chief Horticulturist, South Australia.

Mr. E. S. West, Research Station, Griffith, New South Wales.

Mr. D. G. Quinn, Viticulturist, Victoria (Secretary).

Pork and Bacon Show.

In a report dated 5th November, 1937, the Commonwealth Veterinary Officer in London stated that the outstanding feature of the Annual Show of the National Pig Breeders' Association held at Peterborough was the predominance of the Large White breed in entries and awards.

Class 1 for Bacon Carcasses weighing 140-167lbs. from two pigs not exceeding 220 days of age drew 25 entries, all of which were Large White except one entry of Wessex Saddlebacks. This entry obtained 82 marks as against 93 allotted to the winning carcasses. In class 2 for heavier bacon carcasses, 167-180lbs., there was only one entry, also a Large White. Class 3 for single bacon carcasses of similar specifications to Class 1 contained 39 Large White entries, 1 Wessex and 1 Berkshire. The winning entry obtained 91½ points, the Wessex receiving 67 and the Berkshire 70. Class 4, although small, was interesting. This class was for carcasses from two first cross pigs of N.P.B.A. breeds, weighing 140-167lbs. and not exceeding 220 days of age.

The winning pen, Large White-Middle White, received 83 points, followed by two Large White-Wessex Saddleback entries which received 78 and 77 points respectively, and the other entry, a Large White-Berkshire, obtained 69 points.

The Porker competition included two classes, one for a single pig not exceeding 155 days of age and weighing 80-100lbs., and the other for pigs not exceeding 175 days of age and weighing 100-120lbs. The Large Whites were represented in the former class by all but one of the 22 entries, the winning carcass being almost devoid of fat on the loin, but exhibiting an exceptional eye of meat. This entry gained 86 points, while the single Wessex entry received only 69 points. The latter class of 27 entries included two Berkshires and two Wessex Saddlebacks, which received 58 and 60 and 77 and 78 marks respectively. The winning Large White obtained 89½ points, while 14 others obtained 80 points or over.

The moral for Australian breeders catering for the British market appears obvious if these breeders have conditions under which the Large White breed can be successfully reared.

All entries in these competitions are judged by measurement standards evolved by Hammond, Davidson, Wright, and Swain, plus eye appraisal by competent judges of pork and bacon.

Potatoes—Fertiliser Experiments

The Plant Food Advisory Council of New South Wales which was formed in 1931 to conduct fertiliser experiments in association with, but beyond the normal scope of, the Department of Agriculture, has just issued a Bulletin describing in some detail its potato experiments in the season 1936-37.

It is claimed that as regards layout and the number of uniform trials carried to completion, the work was the most modern in type and the most comprehensive carried out in Australia to date. In all, 10 trials similar in design were laid down and nine were successfully harvested. The trials were of the "6 x 6 Latin Square" type—*i.e.*, there were six different treatments each of which was repeated six times, and the design was such that the arrangement was entirely decided by chance. This allowed the examination of the results by a statistical analysis which made it possible to state definitely that an observed difference in yield was or was not "significant" or truly due to the difference in treatment rather than to soil variation or experimental error.

In addition to the anlysis of the individual trial results a "group analysis" was also made in which the results as a whole were grouped and examined. It is this group analysis that offers the most important advantage of the "biometric method" for differences which in any one trial may prove to be non-significant will certainly gain in value should they prove to be repeated in a majority of the results examined.

The outstanding feature of the results was undoubtedly the fact that one particular treatment gave the highest yield in all nine trials. This treatment was the heaviest of all, consisting of 10cwts. per acre of a mixed fertiliser comprising 6cwts. of Superphosphate, 2cwts. of Sulphate of Ammonia, and 2cwts. of Muriate of Potash. In the individual trials this treatment was significantly the best in four instances, but in the group analysis, which really amounts to no more than an examination of the "average" results, it was very decidedly significantly better than all other treatments. In this case the average increase over the next nearest treatment was just over 10cwts.

Still considering the grouped results, the next in order were two treatments of 3cwts. of Super, 2cwts. of Ammonia and, respectively, 2cwts. and 1cwt. of Potash. These yielded, respectively, 9cwts. and 10cwts. per acre more than the next in order, which was 3cwts. of Super, 1cwt. of Ammonia, and 1cwt. of Potash. The latter treatment, again, was significantly better by 6cwts. and 8cwts., respectively, than the last two treatments—3cwts. Super plus 2cwts. Ammonia, and 3cwts. Super plus 1cwt. Ammonia. For greater clarity, the average yields are set out hereunder:—

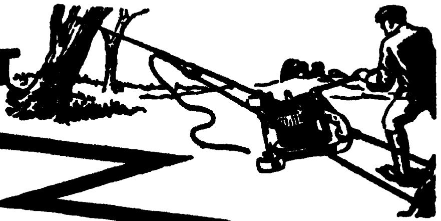
				Yield Per Acre.	
	Super.	Ammonia.	Potash.	Tons.	Cwts.
(1)	6	2	2	8	3¾
(2)	3	2	2	7	13¾
(3)	3	2	1	7	12¼
(4)	3	1	1	7	3½
(5)	3	2	0	6	17¾
(6)	3	1	0	6	15¾

Considered from the point of view of the individual plant foods, it will be seen that Superphosphate was used only once at a level higher than the normal 3cwts. application and, on that occasion, by comparison with the 3 : 2 : 2 treatment, it gave an impressive increase in yield.

Ammonia gave satisfactory results, and from (3) and (4) it can be seen that in the presence of 1cwt. of Potash the increase from 1cwt. to 2cwts. of Ammonia gave an increase of 9cwts. of potatoes. It will be seen, however, that there is no significant difference between 1cwt. and 2cwts. of Ammonia when Potash is not used.

Where Potash is concerned, two facts emerge. Firstly, it will be seen that any treatment which included Potash gave a result significantly better than the comparable treatment without Potash. Secondly the value of Potash is greater where the quantity of Ammonia is increased for

TEARING THEM OUT



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RESISTS TIME—WEATHER—WHITE ANTS

between (6) and (4) with 1cwt. of Ammonia, the addition of 1cwt. of Potash gave an increase of just on 8cwts., whereas between (5) and (3), with 2cwts. Ammonia, the addition of 1cwt. Potash gave an increase of 14½cwts. It is also clear that 1cwt. of Potash is as effective as 2cwts.

It is emphasised that the results are limited in value by the fact that they refer to one season only but, as against this, the rainfall figures quoted show that the season was not one which would be likely to favour fertiliser unduly for the first two months after planting were exceptionally dry, even Batlow, which was the best district as regards rain, getting only 4in. instead of its average 6¼in.

Considering costs of fertiliser and freight, &c., the Council makes an interim recommendation to the effect that on the average class of potato soil, a fertiliser application of 1cwt. of Potash per acre, which must be pre-applied at the time of the first ploughing of the land to be planted, followed at planting time by an application of 3cwts. of Super and 1cwt. of Ammonia, is the treatment likely to give optimum results.

It is reported that the trials are to be modified next season by increasing the number and range of treatments to include Superphosphate at three levels (3cwts., 6cwts., and 9cwts. per acre), and Ammonia and Potash each at 0cwt., 1cwt., and 2cwts. per acre. By means of a further refinement of layout, it will be possible to utilise these in all possible combinations (making 27 different treatments in all) without, on the one hand, sacrificing accuracy and, on the other hand, making the experiments unduly large.

Apples and Pears for Export.

At the recent Annual Conference of the Australian Apple and Pear Export Council, held at Sydney, it was decided that the following varieties of pears be placed on the recommended export list:—Beurre Hardy, Beurre d'Anjou, Beurre Bosc, Doyenne du Comice, Josephine, Packham's Triumph, Winter Cole, Winter Nelis, Madam Cole, Glou Morceau, Easter Beurre, Duchesse d'Angouleme.

That the following varieties be permitted export in 1938 only, and then to come up for review:—Black Achan, Howell, Marie Louise, Doyenne Bossuch, Lemon Bergamot, Vicar of Winkfield, Williams Bon Chretien, Winter Barlett, Giblins Seedling, Beurre Brettoneau, Middleton, Kieffer.

All other varieties to be excluded from export.

Growers are asked to note the foregoing, so that the necessary re-working can be proceeded with.

Regarding varieties of apples for export, growers are advised to re-work with early maturing red varieties.

Export Lambs.

The following is an extract from a report by the Agent-General (Mr. C. F. G. McCann):—

The first delivery of competition lambs from South Australia made a very attractive display on the front of a very modern butcher's shop in the main street of Portsmouth, and was greatly admired. Personally, I do not think I have ever seen a more attractive display for such an early delivery. The Dorset Horn cross, true to the traditions of the breed, again proved that no other type, breed, or cross can excel this breed of sheep from Dorset in the production of early maturity lambs, and likewise this splendid display again proves that the Southdown ram excels in conformation, no matter what type of ewe it is crossed with. The exhibit of Roseworthy College, bred from crossbred ewes, was an object-lesson in symmetrical proportion, and yielded a carcass evenly covered with meat, with just sufficient fat selvage to "baste" its joints when cooked, thus obviating trimming and cutting waste.

Wireless Talks

The Cultivation of Berry Fruits

An address broadcast through 5CK by E. Leishman, District Horticultural Adviser.

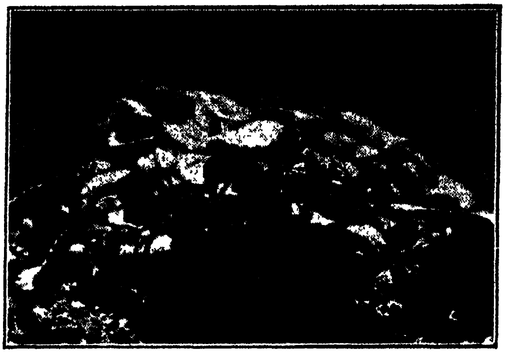
In the Mount Lofty ranges, orchardists are interested to a more or less degree in the cultivation of small fruits such as Strawberries, Raspberries, Loganberries, and Gooseberries. Although all of these berries are popular and highly esteemed for dessert, jam-making, preserving, beverages, etc., it is surprising that the demand for these luscious fruits is not greater.

The growing of berry fruits is considered as a sideline in connection with fruit orchard operations, but a number of growers cultivate bush fruit more extensively.

In the cooler parts of the Hills the general practice is to plant Strawberries or Gooseberries between the young fruit trees, where they are left until they become unproductive, or the trees require the entire space, or the whole of the ground is necessary for the tree.

The grower who intends cultivating berry fruits on a large scale must bear in mind the following points in establishing a plantation. First—Accessibility to markets; second, transport; third, labour supply. With the exception of the Gooseberry, the object with berry fruits is to market them when the fruit begins to ripen, because picking must be continuous, and on large plantations there is a difficulty in obtaining the required labour. This fact has deterred growers from planting extensively.

Most bush fruits can be grown with care and attention on a wide range of soils and climates, but where cultural operations are conducted on a commercial basis, detailed consideration must be given to the two previously mentioned points. The requirements of these fruits are similar, but there is a wide variation in the different species so far as susceptibility to injury by frosts, hot winds, sunscald, &c., are concerned.



Strawberry, Ettersburg 89.

Bush fruits thrive best in cool, hilly districts, the chief factors being a good rainfall, cool climate and protection from hot winds, and providing the soil is of the right character, the plant grows to perfection. Moist soil conditions with good drainage are essential, otherwise the bushes become stunted.

The Strawberry may be grown successfully on almost any class of soil, provided that it is well supplied with moisture, and at the same time, well drained. A sandy loam with a clay sub-soil is most suitable.

Strawberry varieties show decided differences in behaviour on different soils. Some are better suited to clay or heavy soils, while others are adapted to sandy and light soils. For profitable production, soils must contain plenty of humus. It is essential to have a plentiful supply of moisture throughout the growing period. Good cultivation is necessary for the successful growing of strawberries.

When selecting a site, it is desirable to choose a slope which will receive as much of the morning sun as possible. The land should be well broken up from 8 to 10 inches deep, and a cultivated crop—say peas or root crops—planted for a year or two. This is essential where white grubs (which are the larvae of species of beetles) are know to exist. Practically all of the strawberry gardens are worked by hand.

The method of planting is the single, and to a lesser extent, matted rows.

Where the beds are not irrigated, single rows are preferred, because constant cultivation can be applied around the plants. The distance for planting the single rows is 2 feet apart with plant space from 10 to 15 inches in the rows. Matted rows are planted in the same way, and allow all or a part of the runners, to spread between the original plants. The width of the mat can be regulated by the hoe. Where there is a danger of injury from white grubs—causing a loss of plants—the matted system can be recommended; although some of the plants are killed, enough will survive to produce a good yield. Planting can be carried out from May till August—preferably late Autumn. Spread the roots evenly when planting, and leave the crown of the plant above ground level.

Strawberries, Fendelcino variety, at Upper Sturt

Varieties.

In selecting varieties of strawberries, colour and texture are very important factors for marketing; a bright pinky red, or a bright deep red are the most popular fancies. A very dark red colour or light coloured berries depreciate their marketing quality. A good texture berry will hold its appearance well for several days. Strawberry varieties in cultivation have two types of flowers—perfect and imperfect. Varieties having perfect flowers will produce a crop when planted by themselves. Imperfect flowers will not bear unless pollinated with perfect varieties. The main varieties grown in South Australia are Ettersburg 89, Melba, Gandy, and Rhodes Special.

Ettersburg 89 has come into prominence of late years. It favours a free loamy soil and will not thrive with bad drainage. It carries a very heavy first crop, but is light in the second. It is a good jam fruit, its only disadvantage being that it is difficult to stem.

Melba is better suited to the colder and wetter parts of the hills, and does well under irrigation. Gandy has been cultivated for some time; it prefers a heavy class of soil, and is recommended for the warmer localities of the hills. The blossoms of the Rhodes Special being highly staminate make it a good variety for a pollinating agent. It is an excellent variety for the home garden.

Fendelcino is a promising variety that has been tried recently. It produces large berries which are of a bright dark red; the texture is firm and the fruit of a good flavour. As the blossoms are incomplete, it must be pollinated by another variety—preferably Rhodes Special.

General Treatment of Beds.

Towards the end of winter, the beds are fork-hoed or dug, and a good dressing of manure applied, using bonedust or blood manure, or a mixture of both at the rate of 10lbs. to 20lbs. to the rod. Under irrigation, and if the crop gives evidence of a promising yield, a dressing of sulphate of ammonia or blood manure may be applied during the growing period, taking care not to place the manure too close to the plants. To keep the berries from being splashed with dirt after rain or irrigation, it is desirable to provide a mulch, either of straw or grass.

The Raspberry.

This fruit thrives best in a cool, moist climate, such as is usually experienced in the heavily timbered country of the Hills, and on this account its range in this State is limited. Protection from hot winds is essential, and it will be found that plants do well in sloping gullies, provided with abundant shelter. A slope facing the south and south-east, being well protected from the hot north winds and the sun during the greater part of the afternoon is desirable. Best results are obtained in planting Raspberries on virgin soil, because invariably the bushes prove a failure when planted on old land.

The usual method of propagation is to select suckers from fruitful parent plants. Seedlings often come up in the centre of the rows and these should not be taken as suckers and planted. Planting can be done any time after the leaves fall and be extended to early spring; the later planting is favoured. It is advisable to plant a little deeper than the depth at which the sucker originally grew.

To ensure good cultivation, space the rows at 5 feet apart, and plant 4 feet apart in the rows. After planting, cut the old canes from 2in. to 3in. from the base. Bonedust is the fertiliser mostly used, and has given good results; this can be dug in toward the end of winter.

Pruning consists of removing the canes which die after fruiting; also any weak or spindly young growth. The annual canes that are left are brought together or plaited and tied 18 inches to 24 inches from the ground. The slight bow made when tying the canes assists in making the bush more rigid to carry the fruit. Topping in summer is not recommended.

The two commercial varieties grown in the Hills are the Red Antwerp (Common Red) and the Northumberland Fill-Basket. The Common Red is the best jam variety, and the Northumberland Fill-Basket is recommended for marketing purposes. In picking for market, it is necessary to go over the bushes on alternate days; for jam factories about twice a week. Do not pick when berries are wet. As soon as the fruit is picked, the berries should be placed in the shade and kept in a cool place until marketed.

Loganberries.

The difficulty of obtaining suitable sites for the Raspberry has encouraged growers to plant the Loganberry, and in recent years a number of plantations of this fruit have been planted.

This berry may best be described as a cultivated form of the American Blackberry (*Rabus vitifolus*). It is not at all fastidious regarding the soil on which it is planted, but prefers a deep, heavy loam, rich in organic matter. The fruit of the Loganberry is large and tapering, very similar to a mulberry, and when ripe is of a dark purple red colour. It has a marked piquancy of flavour, and is an excellent jam fruit, valuable for bottling, jelly making and beverages.

The chemical anaylsis of the juice shows that the acid content is chiefly in the form of citric acid, and for this reason it is refreshing and pleasant, and acts as a tonic to the human system.

In choosing a site for the plantation, care must be taken to avoid gullies, where air drainage is bad. The Loganberry is comparatively early blooming, so that there is a possibility of the crop being destroyed by frosts. In the absence of natural shelter, breakwinds should be provided, and it is advisable to plant the rows parallel to the direction of the prevailing winds. The Loganberry propagates naturally from the tips of its season's growth. Planting is done in early spring in the Hills districts, and in drier climates, about the end of June. The plants are set out in rows 6ft. apart with 6 to 8 feet between the plants in the rows. The cheapest and most satisfactory system of training is a trellis 3 feet high, consisting of a single wire stapled at the top of the post, using plain black No. 8 fencing wire. Plain galvanized wire should not be used, because the canes do not grip sufficiently and are blown about with the wind. Pruning consists of removing the old canes and 8 to 12 annual shoots are selected and twisted on the wire; any lateral shoots that arise on the canes are cut back to 2 or 3 buds.

Gooseberries.

Gooseberries have been cultivated by orchardists in the Hills district for a number of years, principally as a side-line in connection with orchard operations while waiting for the fruit trees to come into bearing. The Gooseberry does best in a well-drained clay or loamy soil, and will not thrive in light dry soils. Being hardy, this berry is not easily injured by frosts, but growers should avoid planting on aspects which expose the fruit to the full glare of the afternoon sun.

The plant is easily propagated by cuttings, selecting well ripened wood of the previous season's growth. Most of the cultivation is done by hand, so it is necessary to plant at a distance of 5 feet x 5 feet. The best system of training is known as the "tree form", so called because the bush has one stem. Pruning consists of shortening laterals to within about 1in. or 2in. of their base to form spurs and cutting out sickly or exhausted wood. There are only two varieties grown commercially in this State, "Roaring Lion" and "Ostrich". The former is a large red berry when ripe, and is an excellent fruit for bottling. "Ostrich" is the most popular of the white, yellow, or green varieties.

Anthracnose has caused growers some concern, but the disease can be controlled by spraying with Bordeaux mixture at bud burst.

Further information regarding the cultivation of berry fruits will be willingly supplied by Horticultural officers of the Department of Agriculture.

Seasonal Aspects of the Poultry Industry

An address broadcast through Station 5CK by M. W. Aird (Government Poultry Adviser).

By now (8th November), no breeder should have chicks younger that five weeks of age. Generally speaking, chicks that are hatched after the end of September on the plains, or after the middle of October in the Hills districts do not compare in any way with those hatched earlier in the season. The August and September hatched chicks benefit to a large extent by having plenty of natural greenfeed at their disposal. This factor is no doubt the main reason why they do so much better than later hatched chicks. Also, when chicks are hatched during August and September, the parent stock are in the pink of condition, and their progeny benefit, whereas later in the season the parent stock may be feeling the strain of heavy laying, and consequently the chicks are not the best when hatched. If chicks were hatched by the end of September or early October, they would all now be past the hot brooder stage, and to keep the chicks moving in growth and vigour, no better method than that practised at Parafield Poultry Station could be advised. The method at Parafield is to accommodate the young growing stock in portable cold brooder boxes with outside runs attached, in lots of about 80 chicks to each box. These boxes and runs are frequently moved from one position to another, as there is nothing like fresh ground to promote growth and health in young stock. On no account is the same piece of ground used for more than one lot of chicks during any one season. After the season is completed and the pullets are placed in their permanent laying quarters, the ground that has been used during their growing period should be rested. Later on, it should be cultivated and a crop of green grown on it, so that it is in a perfectly sweet condition for the following season's growing stock.

Feeding Young Stock.

Although generally speaking I am an advocate of moist mash feeding for adult stock, I do not consider that method advisable for feeding chickens until they are at least six weeks old. An experienced person can easily distinguish chicks that are being fed on moist mash several times per day from those being fed on a dry mash. The former method has the effect of keeping the chickens' flesh in a soft condition, and the feathering has a loose appearance whereas the dry mash chick will be found to have much firmer flesh and the feathering is much tighter. I am a keen believer in keeping the young growing stock in a firm, hard condition, and consider that this can only be brought about by feeding them on a balanced dry mash, and when they have access to plenty of free range and natural green feed.

Although there may not be much food value in wheat bran, it is a very necessary ingredient for inclusion in the mash, whether moist or dry. Good clean bran provides the necessary roughage that the young stock require, and consequently keeps their blood well toned up and their bowels in a laxative condition. When the chicks are from three to six weeks of age, the mash should contain 60 per cent. bran, 30 per cent. pollard, 5 per cent. buttermilk powder and 5 per cent. bone meal. When the chicks have advanced to say six to 12 weeks of age, it will be found advisable to decrease gradually the bran and increase the pollard, until there are equal parts of each by weight. In addition to the mash feeding, it will be found necessary to feed a little cracked wheat each day until the chicks are old enough to eat whole grain wheat. Shell and charcoal grit should always be available for the chicks to eat when they so desire.

If the person concerned does not have the necessary space at his disposal for allowing the growing chicks to have free range, the chicks must be provided with plenty of finely chaffed green feed each day. Lettuce and silver beet leaves, given whole, make excellent green fodder for young stock. When green leaves of this nature are fed, the chickens have no difficulty in picking off small pieces at a time; hence there is no danger of causing crop and digestion trouble.

Disposal of Surplus Stock.

At this time of the year, providing the necessary accommodation for the most forward pullets becomes a problem to most breeders. The exception to the rule is when the farm concerned is equipped with sufficient housing accommodation for the future layers at this juncture without having to disturb the present layers. Having the extra accommodation is the ideal way of conducting a poultry farm; however, the extra outlay in capital is the stumbling block against such a policy being often put into practice.

Generally at this time, one finds that breeders have to make room by increasing the number of birds in the sheds they have have at their disposal. This method will, at times, bring about trouble from the overcrowding that takes place, and in any case it will certainly throw the present producers off production to some extent.

Generally speaking, before Christmas is too early to commence culling the old birds to any extent, as they should continue to show a profit for a month or two in the new year, but as the time will soon be at hand when it will be necessary definitely to sell off the surplus old stock, a few words in regard to culling should be opportune.

Identifying the Non-Layer.

The selection of the non-layer or hen out of production becomes comparatively easy to the average person who has had a few years experience with poultry. The head of the fowl is an indicator of its general health. When the comb and wattles are of a bright red colour, one can be assured that the bird's health is all right. However, a bright red comb is not in all cases an indication that the bird is in production. The eye of a good layer is always bright and prominent, whereas the poor layer has an eye that is dull and sunken back into the head. Poor layers also often have long, shallow heads. The good layer is one that is smart in general appearance, fine in bone and comb texture, among those first off the perches in the morning and always ready for her meals. The poor layer is coarse in bone and comb texture, and has a lazy appearance.

In a breed such as White Leghorns, which have yellow beaks and legs, poor layers can be picked out at this time of the year on account of their having retained the colour. It is quite in order for a pullet or hen just commencing a season's laying to have the rich yellow pigment, but this pigment soon disappears after laying commences. The better the layer the more quickly the pigment disappears. In almost every instance when a hen that has retained the rich yellow pigment is handled, it is found that it has the other faults previously mentioned. When January arrives, it is a wise plan to cull out and dispose of any birds that commence moulting. In fact, it is very doubtful whether it is profitable to retain birds that moult in January or the first portion of February. When birds moult during those months, in almost every instance, they lose all the bright red comb and wattle colour, and are out of production for several months. Whereas on the other hand late moulters will get the job over much more quickly and be back into lay as early in the year as the early moulters.

There are producers who select late fast moulters as their future breeders and benefit greatly by doing so, as a large percentage of their progeny inherit a like good quality. I am not a believer in culling out hens on account of their age alone. I often quote the following adage:—"It is better to keep a good old hen rather than a poor young one." Almost invariably the heavy layer is quite docile and does not object to being handled. The cull has a disposition quite in keeping with her head and type. She is wild and noisy, and will struggle while handling is being attempted.

Marketing.

As previously mentioned, the 1937 Spring hatching season should have been completed five weeks ago; hence there is nothing to gain and much may be lost through having the male birds mated at this time of the year. When eggs are fertile, it only needs a hot day or two to commence germination, decay soon follows and the eggs are of no more use for any purpose. The time is near at hand when the 1937 Overseas Export season will be completed. It has not yet been found possible to ship eggs in shell overseas to return profitable prices to the growers much later than the end of November each year. Although production of eggs is not so great during December and January as it is in the Spring months, it does not decrease to the extent of eliminating all the surplus, and hence it is found very difficult to find satisfactory markets during those two months.

Most of the egg merchants have to resort to placing their surpluses in cold storage after overseas export terminates, and as it is necessary for eggs to be of a high standard in regard to quality for cold storage purposes, growers should do their utmost to see that their eggs are up to the required standard when marketed. Infertile eggs will of course soon show signs of staleness if not given the necessary care. However, they are always preferable to fertile eggs for eating purposes.

The following are a few useful hints in regard to keeping eggs up to high quality standard:—

(1) Remove all male birds from the hens, so that the eggs will be infertile when marketed.

(2) Collect the eggs two or three times per day from the nests.

(3) Clean the eggs each day.

(4) Forward the eggs to the Egg Floors at least twice weekly during the hot months.

(5) Feed layers regularly each day on mash with a liberal quantity of green feed included in it.

Egg cleaning is a matter which needs the greatest care; one can easily cause harm to the eggs if too much water is used.

When eggs are cleaned soon after they have been laid, any foreign matter on the shells can easily be removed by using a slightly wet cloth. Should a very wet cloth be used, there is a danger of some of the water penetrating inside the shell. The water inside the shell will cause a mould to form if the eggs are placed in storage for any length of time.

In case any poultry keepers are practising the Soaked Wheat method of feeding, I feel I should revert to my remarks in reference to the losing of the yellow pigment by good producers after they have been in production some time. Experimental feeding tests with soaked wheat are being conducted at Parafield Poultry Station, and it is found that good layers are retaining the pigment much longer when fed on that method than they do when fed otherwise. Evidently the feed has the effect of retaining the pigment.

Seed Wheat from Crop Competitions, 1937-38

In Wheat Crop Competitions conducted in the under-mentioned districts the following Competitors exhibited crops which, in the opinion of the Judge at the time of inspection, should produce grain suitable for seed purposes.

BUXTON.

Competitor and Address. Varieties.

Lienert Bros., Buckleboo—Nabawa, Dundee.

WAY.

Messrs. Gaden & Linke, Koonibba—Early Gluyas.
E. W. Bolace, Charra—Quality, Gluford.
Messrs. Hazledine & Sons, Charra—Early Gluyas.
M. Martin, Maltee—Quality.

ALFRED.

P. Paul, Alawoona—Gluyas, Dundee, Ranee 4H.
Moorook Farming and Grazing Company (C. S. Goldsworthy and E. A. Voight), New Residence —Waratah.
R. O. Voigt, New Residence—Dundee.
W. A. Thiel, Taldra—Ranee 4H.
A. Stirling, Malpas—Ranee 4H.
A. W. Traeger, Loxton—Baringa.
W. Paul & Sons, Alawoona—Sword.
A. C. Reichstein, Paruna—Silver Bart.
A. C. Webb, Paruna—Sword, Ford, Dundee, Baringa.
E. M. Edwards, Paruna—Ranee 4H.
Auricht Bros., Taldra, Ranee 4H, Sword.
A. E. Obst, Taldra—Baringa, Sultan, Nabawa.
G. E. Hyde, Paruna—Ranee 4H, Nabawa.
B. Sackse, New Residence—Bencubbin.
A. G. Petch, Meribah—Ranee 4H.
G. J. Zimmermann, Meribah—Baringa, Nabawa.
L. G. J. Cummings, Paruna—Merridin.

WESTERN.

R. P. Noble, Port Pirie—Nabawa.
L. C. Crouch, Wandearah East—Ford.

JERVOIS.

A. Spriggs, Cleve—Ford, Ranee 4H.

LE HUNTE.

H. Broad, Condada—Ford, Bencubbin.
W. M. Heath, Pygery—Totadgin.
S. C. Billinghurst, Minnipa—Totadgin, Ford, Nabawa, Sword, Sultan, Merridin.
A. J. Shepherd, Wudinna—Bencubbin.
G. P. Symons, Pygery—Nabawa.
J. F. Kammerman, Pygery—Bencubbin.
P. P. Cook, Mount Damper—King's White.

CENTRAL.

W. K. Oliver, Wasleys—Sword.
M. H. Richter, Reeve's Plains—Sword.
L. W. George, Wasleys—Sword.
P. J. Shanahan, Freeling—Sword.
W. H. Lawes, Sandy Creek—Ford.
A. M. Dawkins, Angle Vale—Dundee.
A. W. Roediger, Gawler—Ford.
H. J. Griffiths, Salisbury—Dundee.

SOUTHERN YORKE PENINSULA.

L. Boundy, Minlaton—Waratah.
E. H. Giles & Son, Yorketown—Baringa.

NORTHERN YORKE PENINSULA.

O. D. Jericho, Arthurton—Ford.
R. S. Bussenschutt, Paskeville—Ford.

BALAKLAVA.

Competitor and Address. Varieties.

C. S. Shackley, Owen—Sword.
Harkness Bros., Owen—Ford.
G. O. Uppill, Balaklava—Sword.
J. D. Campbell, Barabba—Sword.
C. W. Mundy, Barabba—Ford.
D. J. Wilson, Stockyard Creek—Nawab.
F. D. Lake, Owen—Sword.
A. S. Evans, Owen—Sword, Bencubbin.
Sorrell Bros., Barabba—Sword, Ford.
H. Bradley, Owen—Sword, Ford.
Bowyer Bros., Owen—Sword.
M. Brady, Mallala—Sword.
F. E. Franks, Mallala—Sword.
A. G. Roberts, Mallala—Gluyas.
Baker Bros., Woods—Nabawa.

ROBINSON.

J. & F. Cash, Syringa—Late Gluyas.
J. A. Dodgson, Collie—Bencubbin.
D. Hood, Collie—Totadgin.
J. J. Murphy, Mount Hall—Late Gluyas.
P. J. Murphy, Mount Hall, Late Gluyas.
M. Smith, Collie—Bencubbin.

ALBERT.

C. H. Grieger, Nildottie—Bencubbin.
F. W. Horstmann, Netherleigh—Bencubbin.
J. W. G. Mann, Mindarie—Dundee, Baringa.
A. E. Carslake, Kunlara—Ranee 4H.
W. H. Todd, Caliph—Baringa.
T. M. G. Vowles, Wanbi—Ranee 4H, Dundee.

FLINDERS.

H. O. Clements, Yeelanna—Waratah.
W. H. Watkins, Yeelanna—Ford.
R. R. Wilson, Yeelanna—Improved Ford.

SOUTHERN.

Rankine Bros., Strathalbyn—Baringa.
R. J. & J. Mitchelmore, Strathalbyn—Baringa.
E. E. Liebelt, Monarto South—Sword.
C. F. Altmann, Monarto South—Sword.
M. & E. Thomas, Monarto South—Sword.
H. Paech, Rockleigh—Dundee.
A. R. Strauss, Monarto South—Baringa.
S. Wachtel, Palmer—Bobin.
H. H. Krause, Palmer—Dundee.
S. Bretag, Mannum, Nabawa.
Wachtel Bros., Palmer—Dundee.
J. O. Bottroff, Palmer—Dundee.
E. O. Paech, Palmer—Sword.

TATIARA.

J. E. K. Ridgway, Wolseley—Dundee.
E. W. Sharrad, Wolseley—Dundee.
Fisher Bros., Bordertown—Dundee.
E. J. Buckley, Bordertown—Dundee, Ghurka.
H. C. M. Pilgrim, Wolseley—Dundee.
J. B. Smith, Bordertown—Dundee.
L. Y. Langdon, Bordertown—Ranee.
Tilley Bros., Bordertown—Dundee.

SEED WHEAT FROM CROP COMPETITIONS—*continued.*

CHANDOS.

Competitor and Address. Varieties.
L. J. T. Foale, Parilla—Ranee 4H.
F. A. Maegher, Pinnaroo—Sepoy.
G. E. Harding, Parilla—Bobin.
F. H. Whittlesea, Jabuk—Bencubbin.
A. J. Beelitz, Parrakie—Baringa.
R. C. Kerley, Parilla—Bobin, Bena, Ranee 4H.
R. M. Neindorf, Parilla—Bobin.
W. J. Ross, Parrakie—Dundee.
E. S. Ross, Parrakie—Sword.
Przibilla Bros., Parrakie—Silver Bart.
P. S. Tonkin, Lameroo—Ranee 4H.
A. J. A. Koch, Lameroo—Bencubbin.
Foale & Sons, Parilla—Ranee 4H.
C. W. Lehmann, Lameroo—Sword.

MID NORTH.

H. A. Zweck, Hart—Ford.
A. S. Kirk, Merriton—Ford.
Spencer Bros., Koolunga—Felix.
J. L. Howard, Yacka—Ford.
F. J. Pedler, Koolunga—Bencubbin.
W. P. R. Simon, Halbury—Sword.
M. Smart & Son, Gulnare—Sword, Bencubbin.
J. L. Noonan, Gulnare—Bencubbin, Sword.
E. E. Richards, Narridy—Sword.
E. H. Bentley, Koolunga—S.H.J.
A. Maitland, Rochester—Nabawa, Ranee 4H.
E. H. Ottens, Brinkworth—Bencubbin.
E. D. Whitehorn, Koolunga—Dundee.
E. E. Lang, Georgetown—Nabawa.

MID-YORKE PENINSULA.

O. H. Heinrich, South Kilkerran—Ford.

NORTHERN.

Competitor and Address. Varieties.
J. Rucioch, Laura—Baringa.
J. C. Kleinig, Laura—Dundee.
B. B. Moy, Jamestown—Nabawa.
J. W. Prior, Gladstone—Ranee 4H.
Amey Bros., Caltowie—Bencubbin.
Smith Bros., Laura, Baringa, Dundee.
Blieschke Bros., Melrose—Baringa.
H. R. Lines, Laura—Sword.
N. W. Royal, Caltowie—Bencubbin.
J. R. Deer, Wirrabara—Dundee, Baringa.
J. A. Halse, Beetaloo Valley—Bencubbin.
J. E. Lehmann, Caltowie—Bencubbin.

RUSSELL AND BUCCLEUCH.

A. Y. Knight, Borrika—Sword.
R. S. Saunders, Yurgo—Sword.
M. C. Rogers, Yurgo—Sword.
G. R. Tregilgas, Yurgo—Baringa.
Mrs. M. H. Hopgood, Yurgo—Sword.

FAR NORTHERN.

E. H. Hampel, Terka—Dundee, Ranee 4H.
J. M. Modystach, Wilmington—Dundee.
F. T. Orrock, Wepowie—Sword, Dundee, Ranee 4H.
J. F. W. Orrock, Wepowie—Ranee 4H.
I. G. Schulz, Terka—Baringa, Dundee, Sword.
H. G. Kupke, Morchard—Ranee 4H.
Gregurke & Burns, Wepowie—Merridin.
B. S. McCallum, Morchard—Ranee 4H.
E. H. Schulz, Terka—Sword.
W. G. Gregurke, Wepowie—Felix, Dundee.
D. G. George, Wilmington—Sword.
J. F. W. Roocke, Wepowie—Ranee 4H.

Control of Squash Melons.

In the course of a reply to a correspondent at Lameroo who asked how best to deal with a very prolific growth of squash melons, Mr. W. J. Spafford (Director of Agriculture) says that it is unfortunate that the squash melons (*Cucumis myriocarpus*) have developed unrestricted, but provided that sufficient summer rain is received to lead to a good germination of the seed, there should not be very much bother when the land is fallowed next time. Make certain to put sheep on the fields most badly infested with melons soon after the seeds have germinated, and if kept on while ever the plants are growing, it will not take long for the sheep to kill the plants and prevent the production of more seed. If the sheep must be kept in the fields so long that the stubbles are eaten right out, a mixture of 15lbs. rye and 40lbs. oats should be drilled into the land in April to be used for grazing purposes.

If the summer rains are too scanty to germinate the melon seeds, trouble will be experienced when the land is fallowed, but the melons can be controlled by putting sheep on the fallow while the melon plants are very small, and keeping them there until a thorough weed-killing cultivation can be given. The lambs will have been sold before it is necessary to put the ewes on the fallow, but the sheep will suffer a little while the weed is being controlled.

The squash melon is not so very difficult to control where plenty of sheep are maintained, provided that the plants are not allowed to develop to too great an extent before the sheep are put on to them. Sheep do not dislike the plants, unless there is a lot of more palatable plants present, and do fairly well on them when other feed is available also.

Stock Troubles

[*Replies supplied by Veterinary Officers of the Stock and Brands Department.*]

Sheep.

MULES OPERATION.

"Hawker" asks for information concerning the Mules operation. Reply: The Mules operation is performed mainly for the removal of the skin folds of the breech of the sheep as well as for correcting other defects that sometimes arise in this area in ewes. There is good evidence that the removal of the skin folds, if efficiently performed, both improves the conformation of the breech, and very materially reduces the liability of this area to strike. The operation can be performed at any age. Lambs can be treated as young as 2 to 3 weeks. With older sheep probably the best time to operate is after shearing, when the wool over the parts being short one is more accurately able to judge just how much folded skin should be cut off. The operation does not seem to worry the sheep to any extent, and the wounds soon heal up. It is best performed with special shears, which have been invented by Mr. Mules, the originator of the operation.

BLOWFLY STRIKE.

"Carrieton" asks for a suitable preparation to prevent fly strike. Reply:—It is presumed that the inquiry is for a dressing for application for healing and protective purposes to sheep that have been "struck." The boric glycerine preparation is outstanding for this purpose, and it is rather unfortunate that the present state of world upset has caused the cost of glycerine to rise to its present high price. There is no other dressing comparable with this one—as all others, while they provide satisfactory healing, do not keep the fly away from the wounds for any great length of time, and must therefore be applied repeatedly if the fly is prevalent at all. The following preparations are recommended as being the most satisfactory substitutes:—

1. Cotton seed oil, 45 parts (by volume); petrol, 40 parts (by volume); pine tar oil, 10 parts (by volume); carbolic acid, 5 parts (by volume).
2. Creosol, 1 part; turpentine, 6 parts; olive or cotton seed oil, 20 parts.
3. Five per cent. watery solution of zinc sulphate.
4. Four per cent. phenol crystals in strong carbolic acid, 4 parts; carbon tetrachloride, 5 parts; whaleoil, 100 parts.
5. Five per cent. watery solution of Monsol.

NAVEL INFECTION IN LAMBS.

Secretary, Wasleys Agricultural Bureau reports lambs discharging at the navel. Reply: Navel infections are not uncommon in lambs and frequently lead to lameness and swollen joints. Paddocks which are continually used for lambing are often the cause of the trouble, and it is advisable to change the "lambing" paddock each year if "navel infection" or "lameness in lambs associated with swollen joints" is observed. Treatment consists in—

1. If abscess is present open with a clean knife and disinfect with a single dressing of equal parts of glycerine and carbolic acid or strong tincture of iodine.
2. If no abscess present dress navel daily for a few days with the following solution:—Copper sulphate, ½oz.; water 1 pint.

Horses.

"Rockleigh" reports mare with very swollen legs, 3 weeks prior to foaling and retention of afterbirth. Reply: The swelling which had been noted first about 3 weeks prior to foaling, often occurs, especially in aged mares in the last 6 weeks of pregnancy, and is no cause for alarm, as it is due to defective circulation brought about by the pregnant condition. A much more serious happening is the retention of the "afterbirth" in mares, and if it has not been expelled in 8 hours, it is advisable to inject mild antiseptic solutions such as 3 tablespoonsful of lysol, mixed in 1gall. of water, taking care that syringes are thoroughly clean, and that the water has been previously boiled. Blood poisoning following retained membranes is not uncommon in mares, and is a very serious condition. Providing the mare is showing no sign of discharge, and is eating well, there is no need to worry, but if discharge is noticed, she should be douched out at least twice a day with mild antiseptic solution, such as lysol (3 tablespoonsful), and water (1gall.), or ½ tablespoonful of Condy's crystals, in 1gall. of boiled water. Do not give Aconite unless mare is fevered.

WATERING BEFORE OR AFTER FEEDING.

Secretary, Summerfield Agricultural Bureau asks which is the best time to water horses, before or after feeding? Reply: Where horses do not have free access to water, they should always be watered before, not after feeding, the reason being that if watered after feeding a quantity of food is washed out of the stomach, which may lead to a colic. Water, when swallowed, does not remain in the stomach but passes on to the caecum, commonly known as the "water-bag." If horses can have access to water at any time they do not take in the same quantity of water that they would do if only given a drink two or three times a day.

Veterinary Science as a Career

Students who may be considering Veterinary Science as a vocation would probably appreciate some information regarding the prospects of this profession as a career.

The number of qualified veterinary surgeons in Australia is comparatively small, being insufficient to meet the present requirements, and likely to remain so for some years to come.

The principal fields for employment are with the Commonwealth, State and Municipal services, all of which offer good salaries under satisfactory conditions. There are also many public corporations employing their own veterinary surgeons and an increasing number of private bodies are now appointing their own expert veterinary advisers.

To those who prefer private practice to departmental duties, there are opportunities in all the States for the young and energetic graduate to build up a lucrative practice. In this connection it may be of interest to note that each State of the Commonwealth now has a Veterinary Surgeons Act providing for the registration of Veterinary Surgeons.

Such Acts limit the number of registered men not possessing a recognised academic degree, diploma, or licence, to those in practice before such legislation came into force.

During recent years there has been a greater appreciation by stockowners of the value of qualified veterinary surgeons for the control and treatment of diseases of animals, and notwithstanding mechanisation of transport and farm equipment, private practice still offers a reasonably good prospect.

There is also a wide field for those who possess both the inclination and ability to specialise in research into animal diseases, all interested in stock being familiar with the value of such investigations of which Entero-toxaemia, Black Disease, Pleuro-pneumonia, Parasitism, and Deficiency diseases are notable examples.

It is considered that veterinary science offers a very satisfactory prospect to students whose natural inclinations and associations are towards farm stock, and who possess the necessary energy and application to qualify for a degree. In such circumstances the profession of a veterinary surgeon appears to offer special inducements and advantages.

For the purpose of enabling South Australian students to qualify in Veterinary Science, and in the absence of facilities for obtaining a professional education within the State, the Government offers a Veterinary Scholarship to the value of £100 per annum, tenable for five years at the Universities of Sydney or Brisbane. This scholarship is open to students not more than 25 years of age, who have passed the matriculation examination or its equivalent, and who are eligible to enter the Faculty of Veterinary Science at the Universities of Sydney or Brisbane.

It is necessary also that the parents of the successful applicant should have been resident in South Australia for the preceding five years.

Applications for the Scholarship will close on 29th January, 1938, and should be addressed to the Secretary, Minister of Agriculture, Adelaide, from whom any further particulars may be procured.

Parafield Egg-Laying Competition 1936-37

Review of the Competition for the Months of October and November

[By C. F. ANDERSON (Chief Poultry Adviser) and A. CLIFTON (Competition Attendants).]

OCTOBER.

Although weather conditions were very favourable during the month of October for egg production, the return was rather disappointing. A reduction of 3 per cent. on the figures for September is shown, this month's production being 62.7 per cent. compared with 65.3 per cent. for the previous month and 69 per cent. for October, 1936. Reviewing the figures, the peak month of production in this Competition was September, as compared with October in several previous Competitions. An outstanding feature is the fact that the weight of egg, which generally falls off considerably at this period of the year, has kept up really well. This may be due to the fact that early in the month extra green feed was fed in the afternoon. The green feed used was silver beet. It is probable that this may have had an effect on the improved size of egg. The percentage of first grade eggs was 82.2, as compared with 84.6 for the month of September. When it is considered that a first grade egg is a minimum weight of 2ozs., the percentage, particularly for the month of October, is satisfactory.

Among the leading birds in all sections the weight of egg has held particularly well, with the exception of Light Sussex No. 253. This bird is another example of the fact that, particularly with heavy breeds, at this time of the year the heavy layer is liable to lose a little in the weight of egg when a sequence of more than 5 or 6 eggs is laid. The bird with a good performance is White Leghorn No. 60, entered by Mr. J. F. E. Bensch, with a score of 25 first grade eggs. During the month this bird has gained 3 eggs on the leader, and is now in second position.

Another good effort was that of a team of White Leghorns entered by Mr. H. J. Mills. This team laid 117 first grade eggs for the month, and as one bird is not laying, this makes the score more creditable.

Three birds died during the month.

NOVEMBER.

With the appearance of warmer weather during November, production has shown the seasonal falling off. This was particularly noticeable after the two hot days on the 25th and 26th, when a sharp drop in production was evident. Although both of these days were very trying for the birds, no losses were recorded, this being principally due to the fact that a north wind, although a hot wind, created a circulation of air through the pens. It is always noticeable during hot weather that the birds can withstand a very much greater heat when there is a free circulation of air than would be the case on a calm day.

With this sudden burst of heat, the appetites of the birds were less keen. No doubt the lower food consumption tends to reduce production. A very interesting fact noticeable with regard to the lower egg yield, is that it is amongst those birds which have laid badly throughout the whole of the test. The better class of bird continues to lay 5 and 6 eggs every week, with an occasional 7 eggs for the week. Undoubtedly, it is at this time that the strain of heavy laying makes itself felt in the birds lacking in stamina to complete the 12 months hard laying. This is also noticeable in respect of mortality. During the last 3 months 12 deaths have occurred, but not in any instance have these birds had any pretence of a reasonable score.

The weight of eggs continues to hold exceptionally good, the percentage for this month being practically the same as October, namely, 82 per cent.

The Rhode Island Red in the Home Project Section still has a substantial lead over all other birds, at the end of the month having a score of 189 first grade eggs. This is one egg higher than recorded by the leading bird at this period last year. The Rhode Island Red laid 93 first grade eggs for the winter test—a period of 4 months; therefore 96 first grade eggs have been recorded during the last 4 months. Continuance of such good laying would result in a fine score being recorded, and as this bird has up to now shown no sign of broodiness, there is no reason why she should not record an extraordinarily good score.

Production for the month was 58.5 per cent., as compared with 62.7 per cent. for October and 63.8 per cent. for the corresponding period of last year.

Feeding Tests at Parafield Poultry Station.

A new series of feeding tests was commenced at Parafield Poultry Station on the 1st April, 1937. Five tests have been arranged each of 50 White Leghorn pullets. The principal object of these tests is to collect some accurate data concerning the results obtained from the soaked grain method of feeding in different ways, also the production of the birds under the various methods of feeding. The following is a list of the tests that have been arranged:—

A. Morning—Soaked wheat at rate of 8lbs. grain per 100 birds, meat meal ½lb. per 100 birds, greenfeed same quantity as dry grain. Afternoon—Same as morning, but meat meal ¼lb. per 100 birds.

B. Morning—Soaked wheat at rate of 8lbs. per 100 birds, ¼lb. meat meal per 100 birds, ¼lb. linseed meal per 100 birds, greenfeed same as No. 1 test. Afternoon—Same as morning, but without the ¼lb. linseed meal.

C. Morning—Soaked wheat once a day at rate of 8lbs. per 100 birds, meat meal ¾lb. per 100 birds. Afternoon—Dry wheat at rate of 1¼ozs. per bird.

D. Morning—Soaked barley twice a day at rate of 8lbs. per 100 birds, greenfeed same quantity as dry grain, meat meal ¼lb. per 100 birds. Afternoon—Greenfeed same quantity as dry grain, meat meal ¼lb. per 100 birds.

E. Morning—Soaked wheat and barley at rate of 4lbs. wheat and 4lbs. barley per 100 birds, greenfeed same bulk as dry grain, meat meal ½lb. per 100 birds, linseed meal ¼lb. per 100 birds. Afternoon—Dry grain at rate of ¾oz. wheat per bird and ¾oz. barley per bird.

The quantity of food as stated in the test will vary from time to time according to the requirements of the birds. The quantities stated in the tests are given as a basis, but are also liable to alteration according to the requirements of the stock.

Test.	No. Eggs Laid from 1st April, 1937, to 31st October, 1937.	No. Eggs Laid, November, 1937.	Total Eggs Laid from 1st April, 1937. to 30th Nov., 1937.
A	4,634	620	5,254
B	4,427	622	5,049
C	4,298	585	4,883
D	3,775	754	4,529
E	4,089	658	4,747

	Value of Eggs.						Cost of Food.											
	1st April to 31st Oct., 1937.			Nov., 1937.			1st April to 31st Oct., 1937.			Nov., 1937.			Return Above Cost of Food, November, 1937.			Total Return Above Cost of Food, 1st April to 30th November, 1937.		
	£	s.	d.	£	s.	d.	£	s.	d.	£	s.	d.	£	s.	d.	£	s.	d.
A	22	10	4	2	10	4	7	18	9	1	1	8	1	8	8	16	0	3
B	21	3	5	2	10	6	7	16	4	1	1	7	1	8	11	14	16	0
C	20	14	9	2	7	5	7	18	9	1	0	11	1	6	6	14	2	6
D	17	13	7	3	1	2	8	2	6	1	3	0	1	18	2	11	9	3
E	19	5	11	2	13	5	7	19	10	1	2	2	1	11	3	12	17	4

Results of Wheat Crop Competions, 1937

Position.	Name and Address of Competitor.	Variety.	Apparent Yield.	Freedom from Weeds.	Freedom from Disease.	Trueness to Type.	Evenness of Crop.	Total.
		Maxima—	35	25	20	15	5	100
	ALFRED.							
	Judged by R. L. GRIFFITHS, District Agricultural Adviser.							
1	P. Paull, Alawoona	Gluyas, Dundee, Ranee 4H	32	24	19	14½	4½	94
2	Moorook Farming and Grazing Co., C. S. Goldsworthy, and E. A. Voigt, New Residence	Waratah	32	23½	18½	14	4½	92½
3	R. O. Voigt, New Residence	Late Gluyas and Dundee	32	23	18	14½	4½	92
	W. A. Thiel, Taldra	Ranee 4H	30	24	19	14½	4½	92
5	J. Guthleben, Kringin	Late Gluyas and Nabawa	30	23½	20	13½	4½	91½
6	A. Stirling, Malpas	Ranee 4H	29	24	19	14½	4½	91
7	A. W. Traeger, Loxton	Baringa	31	21½	19	14½	4½	90½
	O. E. Klau (3), Veitch	Sultan	32	23	18	13½	4	90½
	W. Paull & Sons, Alawoona	Sword	28½	24	19	14½	4½	90½
10	E. O. Arnold, New Residence	Dundee	30	23½	18½	13½	4½	90
	E. W. Eckermann, Pyap	Dundee	31	22½	19	13½	4	90
	P. Paull, Alawoona	Ranee 4H	28	24	19	14½	4½	90
13	A. W. Traeger, Loxton	Dundee	29	23	19	14	4	89
14	R. E. Thiele, Loxton	Bencubbin	29	23	19	13½	4	88½
	A. C. Reichstein, Paruna	Silver Bart	28	23	19	14½	4	88½
16	Ross Hondow, Paruna	Ranee 4H	29	24	18½	13½	3	88
17	A. C. Webb, Paruna	Sword, Ford, and Baringa	26½	23½	18½	14½	4½	87½
	E. M. Edwards, Paruna	Ranee 4H	26½	23	19	14½	4½	87½
19	Auricht Bros., Taldra	Ranee 4H	24½	24½	18½	14½	5	87
20	O. E. Klau (1), New Residence	Sultan	26½	24½	17½	13½	4½	86½
	B. C. Watson, Loxton	Sword	27½	24	17	14	4	86½
	R. E. Thiele, Loxton	Pusa 4	27½	23	19	13	4	86½
	A. E. Obst, Taldra	Baringa, Sultan and Nabawa	26½	23	18½	14½	4	86½
	G. E. Hyde, Paruna	Ranee 4H	24½	23½	19½	14½	4½	86½
25	P. M. M. Shannon, Taldra	Ranee 4H	27	22½	19	14	3½	86
26	O. E. Klau (2), New Residence	Sultan	25½	24	18	13½	4½	85½
27	E. W. Schrober, New Residence	Sivler Bart	26½	23	18½	12½	4½	85
28	P. R. Hodge, Nangari	Golden Drop	25½	23	18	14	4	84½
	A. C. Webb, Paruna	Dundee and Sword	23½	23½	18½	14½	4½	84½
30	Auricht Bros., Taldra	Ranee 4H and Sword	22	24½	18	14½	5	84
31	Fitsch & Mickan, New Residence	Gallipoli, Dundee and Gluford	26½	23½	16½	13	4	83½
	A. A. Patterson, Paruna	Sword	22	23½	19½	14	4½	83½
	G. E. Hyde, Paruna	Nabawa	22½	23½	19½	14½	3½	83½
34	J. F. W. Schober, New Residence	Silver Bart	23½	24	19	12½	4	83
35	D. D. Cameron, Paruna	Sword	22½	24½	16½	14	4½	82
36	B. Sackse, New Residence	Sword and Bencubbin	22½	23	18	14	3½	81
	A. Cockshell & Sons, Paruna	Sword	19	24	19	14½	4½	81
	N. W. Zimmerman, Meribah	Nabawa	20	24	19	14	4	81
39	A. G. Petch, Meribah	Ranee 4H	21	21½	19	14½	4	80
	G. J. Zimmermann, Meribah	Baringa	19	23½	18½	14½	4½	80
	L. J. G. Cummings, Paruna	Merridin	19	23	19	14½	4½	80
42	W. A. Freundt, New Residence	Nabawa	20	23	19	12½	4½	79
43	G. J. Zimmermann, Meribah	Nabawa	20	20	19½	14½	4½	78½

RESULTS OF WHEAT CROP COMPETITIONS—continued.

WAY.

Judged by W. H. BROWNRIGG, District Agricultural Adviser.

Position.	Name and Address of Competitor.	Variety.	Apparent Yield.	Freedom from Weeds.	Freedom from Disease.	Trueness to Type.	Evenness of Crop.	Total.
		Maxima—	35	25	20	15	5	100
1	Gaden & Linke, Koonibba........	Early Gluyas	28	20	17	14	4½	83½
2	E. M. Bolace, Charra	Quality and Gluford	23	23	17	13½	4½	81
3	Hazeldine & Sons, Charra	Early Gluyas	24	22	17	14	3½	80½
4	M. Martin, Maltee	Quality	25	20	16½	13½	4½	79½
5	E. Swartz, Ceduna	Late Gluyas	22	22	18	13	4	79
6	L. M. Martin, Maltee	Quality	21	22	18	13½	4	78½
7	E. A. Payne, Koonibba	Pusa	24½	19	16	13½	4	77
8	E. A. Payne, Koonibba	Waratah ...	24	19	17	12	3½	75½
	R. Edson, Maltee	Late Gluyas	22	21	15	13½	4	75½
10	J. Swartz, Maltee	Late Gluyas	23	20	15	13	4	75
11	J. E. Paech, Ceduna	Ranee	19	21	17	13	3½	73½
	W. H. Watson, Mudamuckla	Nabawa	21	19	17	13	3½	73½
	J. Reincke, Mudamuckla	Wagga and Nabawa	18	20	18	13½	4	73½
14	R. Lovelock, Smoky Bay	Riverina ...	25	17	13	13	4	72
15	E. A. Payne, Koonibba	Ranee	22	17	16	13	3½	71½
16	G. & H. Moody, Ceduna	Quality	17	20	16	13	4	70

WESTERN.

Judged by E. L. ORCHARD, District Agricultural Adviser.

Position.	Name and Address of Competitor.	Variety.	Apparent Yield.	Freedom from Weeds.	Freedom from Disease.	Trueness to Type.	Evenness of Crop.	Total.
1	R. P. Noble, Port Pirie	Nabawa	28	23	20	14	4	89
2	W. R. Duffield, Wandearah East .	Quality	31	20	19	14	4	88
3	H. Williams, Port Pirie	Nabawa	30	23	16	13	4	86
4	W. Vanstone, Wandearah East ...	Quality	31	23	15	13	3	85
5	R. P. Noble, Port Pirie	Nabawa	27	22	19	13	3	84
6	L. C. Crouch, Wandearah East....	Merridin, Ford	29	20	17	14	3½	83½
7	T. W. Vanstone, Wandearah East	Early Gluyas	29	20	18	12	4	83
8	W. A. McDougall, Baroota	Ranee and Gluyas	29	20	17	12	3	81

LE HUNTE.

Judged by W. H. BROWNRIGG District Agricultural Adviser.

Position.	Name and Address of Competitor.	Variety.	Apparent Yield.	Freedom from Weeds.	Freedom from Disease.	Trueness to Type.	Evenness of Crop.	Total.
1	B. C. Black, Minnipa	Totadgin ...	32	22	18	13	4	89
2	H. Broad, Condada...............	Ford and Bencubbin	31	22	17	13½	4	87½
3	W. M. Heath, Pygery............	Totadgin ...	31	20	18	13½	3½	86
4	S. C. Billinghurst, Minnipa	Totadgin ...	29½	21	17	14	4	85½
5	A. J. Shepherd, Wudinna	Bencubbin ..	30	19	18	13½	4	84½
6	G. P. Symonds, Pygery	Nabawa	30	20	17	13½	3½	84
	J. F. Kammerman, Pygery	Bencubbin ..	30	20	17	14	3	84
8	A. Collins, Warramboo	Nabawa	30	20	17	13	3	83
	R. Woodrup, Pygery	Nabawa	29	20	17	13½	3½	83
	P. P. Cook, Mount Dampier	King's White	29	22	15	13½	3½	83
11	A. C. Billinghurst, Minnipa	Ford, Nabawa	26	20	17	14½	4	81½
12	A. R. Kammerman, Pygery	Canberra ...	25	22	18	12½	3	80½
13	P. P. Cook, Mount Dampier	Sword	26½	19	18	13	3½	80
14	W. P. Bartley, Wudinna	Ford	26	20	17	13	3	79
15	J. Christian, Yaninee	Totadgin ...	30	15	16	13	3	77
16	P. P. Cook, Mount Dampier	Ranee 4H ..	24	19	16	13	3½	75½
17	P. P. Cook, Mount Dampier	Ford	25	16	17	13	3½	74½
18	E. H. Edmonds, Pygery	Ranee, Bencubbin	24	18	16	12	3	73
19	G. Williams, Minnipa	Totadgin ...	20	19	17	13	3	72

Results of Wheat Crop Competitions—continued.

JERVOIS.

Judged by H. D. M. Adams, District Agricultural Adviser.

Position.	Name and Address of Competitor.	Variety.	Apparent Yield.	Freedom from Weeds.	Freedom from Disease.	Trueness to Type.	Evenness of Crop.	Total.
		Maxima—	35	25	20	15	5	100
1	C. E. Stubing, Cleve	Sword	33	24	19½	14	4	94½
2	D. C. McCallum, Rudall	Sword	33	23½	19	13½	4½	93½
	D. C. McCallum, Rudall	Ford	32	24	19½	13½	4½	93½
4	C. E. Stubing, Cleve	Ranee	33	24	18½	13½	4	93
	A. Spriggs, Cleve	Ford	31	24	19½	14½	4	93
	H. Watkins, & Son, Rudall	Waratah	33	23	19	14	4	93
	H. E. Steinke, Mangalo	Ford	32	24	18½	14	4½	93
8	F. I. Kestel, Rudall	Bencubbin	32	23	19	13½	4	91½
9	K. Trembath, Mangalo	Ranee	30	23	18½	14	4	89½
10	G. S. Hauschild, Cleve	Dundee, Nabawa	28	24	19	13½	4	88½
11	F. W. Jericho, Cleve	Nabawa	29	23	19	13	3½	87½
	W. F. Wake, Rudall	Gluyas	30	22	18½	13½	3½	87½
13	L. Hauschild, Cleve	Ford, Sword	27	24	19	13	4	87
	J. J. Deer, Cleve	Gluyas	29	22	18½	13½	4	87
	J. Sims, Cleve	Ranee	27	23½	18½	14	4	87
	K. Nield & Wake, Cleve	Ford	27	23	19½	14	3½	87
17	J. J. Deer, Cleve	Sword	27	23	19	13½	4	86½
18	G. Sims, Cleve	Ranee	25	23½	19	14	4½	86
	M. Rodda, Miltalie	Ranee	27	23	18½	14	3½	86
20	P. J. Storey, Miltalie	Sword, Ranee and Dundee	26	23½	18½	13½	4	85½
21	M. H. Burton, Rudall	Sword	27	22½	18	13½	3½	84½
	F. H. Stubing, Cleve	Ranee	26	22½	19	13½	3½	84½
	D. Bagnell, Miltalie	Ranee	28	22	17½	13½	3½	84½
	F. H. Pearce, Rudall	Ford	26	22½	19	13½	3½	84½
	G. F. Wake, Elbow Hill	Nabawa	24	24	19	13½	4	84½
26	P. C. Wake, Elbow Hill	Nabawa	23	24	19	13½	4	83½
27	A. Spriggs, Cleve	Gluyas	24	23½	18½	13½	3½	83
28	A. Preiss, Cleve	Waratah	23	23	18	13	3½	80½
29	J. Beinke, Elbow Hill. Crop withdrawn from competition.							

CENTRAL.

Judged by R. Hill, District Agricultural Adviser.

Position.	Name and Address of Competitor.	Variety.	Apparent Yield.	Freedom from Weeds.	Freedom from Disease.	Trueness to Type.	Evenness of Crop.	Total.
1	W. K. Oliver, Wasleys	Sword	35	21	17	14½	4	91½
2	W. H. Lawes, Sandy Creek	Ford, Sword	34	20	18½	14½	4	91
3	W. L. Hancock, Wasleys	Sword	33	21	17	13½	4½	89
	V. Harvey, Hamley Bridge	Sword	35	20	18	13	3	89
5	F. McCabe, Wasleys	Sword	34	21	16	13	4½	88½
6	P. J. Shanahan, Freeling	Sword	31	19	18½	14½	4	87
	J. P. Carrigg, Hamley Bridge	Sword	33	21	14	14½	4½	87
8	M. H. Richter, Reeves Plains	Sword	27	21	19	15	4¾	86¾
9	L. W. George, Wasleys	Sword	29	21	18	14½	4	86½
	A. M. Dawkins, Angle Vale	Sword, Dundee	32	19	17	14½	4	86½
11	H. J. Griffiths, Salisbury	Dundee	28	20	19	15	4½	86½
12	R. L. Lines (2), Wasleys	Sword	29	21	17	13	4½	84½
13	A. W. Roediger, Gawler	Ford	26	21	18	15	4	84
14	R. L. Lines (1), Wasleys	Sword	26	20	17	14	3¾	80¾
15	E. W. L. Dawkins, Gawler	Sword	24	19	19	14½	3½	80
16	M. G. Best, Roseworthy	Sword	24	20	18	14	3½	79½
17	A. M. Dawkins, Angle Vale	Ford	26	15	17	13	3	74

RESULTS OF WHEAT CROP COMPETITIONS—continued.

Position.	Name and Address of Competitor.	Variety.	Apparent Yield.	Freedom from Weeds.	Freedom from Disease.	Trueness to Type.	Evenness of Crop.	Total.
		Maxima—	35	25	20	15	5	100
	RUSSELL AND BUCCLEUCH							
	Judged by R. L. GRIFFITHS, District Agricultural Adviser.							
1	J. Bullen, Yurgo	Sword	34	24	18½	14	4½	95
2	A. Y. Knight, Borrika	Sword	31	21½	19½	14½	4½	91
3	R. S. Sanders, Yurgo	Sword, Sepoy Selection, Ford x Hard Federation	31	22	18½	13½	4½	89½
4	G. Coombe, Lowaldie	Gluclub, Nabawa, Gallipoli	27½	24	19	13	4	87½
5	A. Y. Knight, Borrika	Sepoy	30	21	19	12	4½	86½
6	C. H. Robin, Karoonda	German Wonder, Currawa	23	23	19	13	4	82
7	C. T. Smith, Karoonda	Sword	22	23	16	14½	3½	79
8	P. L. Cushion, Karoonda	Waratah, Currawa	21	21	18	14½	4	78½
9	M. C. Rogers, Yurgo	Sword, Indian Blue	15½	23	19½	14	4½	76½
10	G. R. Tregilgas, Yurgo	Baringa	16½	22	18	14½	4	75
11	C. D. French, Karoonda	Sepoy, Gallipoli, Nabawa	16½	23½	16½	12½	4	73
	Mrs. M. H. Hopgood, Yurgo (Yurgo local competition only)	Sword	12	23½	19	14½	4	73
	G. J. Jenkins, Yurgo	Crop cut for hay.						
	ALBERT.							
	Judged by R. L. GRIFFITHS, District Agricultural Adviser.							
1	Todd & Hazelwood, Caliph	Nabawa	32	23	18½	13½	3½	90½
2	Mrs. L. M. Arney, Wanbi	Gluyas, Waratah	30	23½	17½	14	4½	89½
3	C. H. Grieger, Nildottie	Bencubbin	28	23½	19	14½	4	89
4	J. F. W. Horstman, Netherleigh	Bencubbin	28	22½	20	14½	3½	88½
5	J. W. G. Mann, Mindarie	Dundee	28	22	19	14½	4½	88
6	A. E. Horstman, Netherleigh	Ranee 4H	26	24	20	13½	4	87½
7	J. W. G. Mann, Mindarie	Baringa	26	22½	19½	14½	4½	87
8	F. R. Dart, Wanbi	Bencubbin	30	20	19	14	3½	86½
9	W. W. Henty, Wanbi	Rajah	28	22½	17½	14	4	86
10	W. H. Todd, Caliph	Bobin, Sword, Nabawa	26	24	19	12	4	85
	A. E. Carslake, Kunlara	Ranee 4H	26	21½	19	14½	4	85
12	W. H. Todd, Caliph	Baringa	25	21	19½	14½	4	84
13	T. M. G. Vowles, Wanbi	Ranee 4H	24	22	18	14½	4½	83
14	Hein Bros., Copeville	Faun	24	24	16	14	4½	82½
15	T. M. G. Vowles, Wanbi	Dundee, Ranee 4H	23	22½	17½	14½	4½	82
	A. E. H. and T. A. March, Copeville	Gallipoli	25	21½	18½	13	4	82
17	A. G. W. Grant, Sandalwood	Ranee 4H	23	22	18½	14	3½	81

RESULTS OF WHEAT CROP COMPETITIONS—continued.

Position.	Name and Address of Competitor.	Variety.	Apparent Yield.	Freedom from Weeds.	Freedom from Disease.	Trueness to Type.	Evenness of Crop.	Total.
		Maxima—	35	25	20	15	5	100

BALAKLAVA.

Judged by F. C. GROSS, Field Officer, Department of Agriculture.

1	C. S. Shackley, Owen	Sword (2)	35	24	19	12	5	95
2	Harkness Bros., Owen	Ford	31	24	19	14	5	93
3	G. O. Uppill, Balaklava	Sword	34	22	17	14	4½	91½
4	J. D. Campbell, Barabba	Sword	30	23	18	14	5	90
5	C. W. Munday, Barabba	Ford	29	23	18	14	5	89
6	C. S. Shackley, Owen	Sword (1)	32	21	18	13	4	88
7	D. J. Wilson, Stockyard Creek	Nawab	29	23	18	14	3½	87½
8	F. D. Lake, Owen	Sword	27	24	18	13	5	87
9	A. S. Evans, Owen	Sword	29	21	18	13	5	86
	Sorrell Bros., Barabba	Sword, Ford	26	22	19	14	5	86
11	H. Bradley, Owen	Baringa, Sword, Ford	28	22	17	14	4½	85½
12	Bowyer Bros., Owen	Sword	28	20	18	14	5	85
	A. S. Evans, Owen	Bencubbin	27	23	17	14	4	85
	A. S. and P. C. King, Woods	Caird	26	22	18	14	5	85
15	M. Brady, Mallala	Sword	26	22	17	14	5	84
16	F. E. Franks, Mallala	Sword	28	22	15	14	4	83
17	A. G. Roberts, Mallala	Gluyas, Nabawa	26	20	19	13	4½	82½
18	R. O. Moeller, Owen	Caird	28	19	17	14	4	82
19	Baker Bros., Woods	Nabawa	25	20	17	14	5	81
20	E. Munday, Barabba	Sword, Nabawa	22	22	18	13½	5	80½
21	P. H. Laffer, Pinery	Nabawa	26	20	15	14	5	80
	E. W. Wedding, Owen	Sword	28	20	14	14	4	80
23	A. N. and H. Freebairn, Owen	Sword, Ford	24	20	17	14	4	79
24	E. A. Parker, Avon	Bencubbin, Sword	22	22	15	13½	4	76½
25	P. J. Brady, Barabba	Sword	22	22	13	13	4	74

ROBINSON.

Judged by W. H. BROWNRIGG, District Agricultural Adviser.

1	Gunn Bros., Mount Cooper	Ranee 4H	35	23	17	12	4	91
2	J. and F. Cash, Syringa	L. Gluyas	32	23	18	13½	4	90½
3	J. A. Dodgson, Collie	Bencubbin	32	23	17	13½	4	89½
4	D. Hood, Collie	Totadgin	31½	22	17	14	4	88½
5	J. J. Murphy, Mount Hall	L. Gluyas	31½	21	17	14	4	87½
6	P. J. Murphy, Mount Hall	L. Gluyas	32	21	16	14	4	87
7	W. M. Smith, Collie	Bencubbin	28	23	18	14	3½	86½
	P. P. Kenny, Witera	Nabawa	30	22	17	13½	4	86½
9	Gunn Bros., Mount Cooper	Ranee 4H	30	22	18	13	3	86
10	A. E. Starkey, Conglima	Bencubbin, Rapee 4H	29	23	17	13	3	85
11	L. E. Symes, Conglima	Ranee 4H	30	22	16½	12½	3	84
12	L. Shipard, Collie	Bencubbin	27	22	17	13½	3½	83
	A. Dodgson, Collie	Bencubbin	30	20	16	13	4	83
14	G. and P. Cash, Mortana	L. Gluyas	30	20	15	13½	4	82½
15	Anderson Bros., Wurkagie	Nabawa	27	22	17	12	3½	81½
16	A. Dodgson, Collie	Ranee 4H	28	20	15	13	4	80
	J. A. Dodgson, Collie	Ranee 4H, Nabawa	25½	20	17½	13	4	80
	P. and S. Plush, Mortana	L. Gluyas	30	19	15	13	3	80
19	S. Brown, Witera	Bencubbin	25	19	15	13½	4	76½
20	J. Dolphin, Collie	Ranee 4H, Bencubbin	23	18	18	13	3	75

RESULTS OF WHEAT CROP COMPETITIONS—continued.

Position.	Name and Address of Competitor.	Variety.	Apparent Yield.	Freedom from Weeds.	Freedom from Disease.	Trueness to Type.	Evenness of Crop.	Total.
		Maxima—	35	25	20	15	5	100

SOUTHERN.

Judged by R. HILL, District Agricultural Adviser.

Position.	Name and Address of Competitor.	Variety.	Apparent Yield.	Freedom from Weeds.	Freedom from Disease.	Trueness to Type.	Evenness of Crop.	Total.
1	Rankine Bros., Strathalbyn	Baringa, Waratah	34	22	18	14½	4¾	93¼
2	J. O. Bottroff, Palmer	Dundee	33	21	20	14	4	92
3	R. J. and J. Michelmore sen., Strathalbyn	Baringa, Waratah	33	23	17½	13½	4½	91½
4	Wachtel Bros., Palmer	Dundee	30	23	20	14	4	91
	M. and E. Thomas, Monarto South	Sword	31	23	18½	14½	4	91
6	E. E. Liebelt, Monarto South	Sword	28	23½	19	15	4¾	90¼
7	H. H. Cross, Woodchester	Ford	29	24	18½	14	4¼	89¾
8	H. A. Krause, Palmer	Dundee, Sword	29	23	18	14½	4½	89
9	A. R. Strauss, Monarto South	Ranee, Baringa	29	23	18½	13½	4½	88½
	S. Wachtel, Palmer	Bobin	29	23	19	13	4½	88½
11	E. T. and L. Jaensch, Hartley	Ranee	30	23	18½	13	3¾	88¼
12	J. O. Bottroff, Palmer	Nabawa	33	19	18	14	4	88
13	H. H. Cross, Woodchester	Ranee, Nugget	30	23	17	13½	4	87½
14	E. O. Paech, Palmer	Sword, Ranee	30	21	18	14	3¾	86¾
15	B. O. Kubenk, Palmer	Ranee	28	22	19	13	4½	86½
	M. and E. Thomas, Monarto South	Dundee	29	21	19	13	4½	86½
17	Wachtel Bros., Palmer	Ranee, Bobin	27	22	18	14	4	85
	E. R. Rolland, Rockleigh	Sword, Ford	31	20	18	13	3	85
19	E. T. and L. Jaensch, Hartley	Ranee, Bobin, Ford	26	23	18	13½	3¾	84¼
20	J. O. Bottroff, Palmer	Sword	31	19	17	13	3¾	83¾
21	Rankine Bros., Strathalbyn	Ranee, Baringa	30	19	16½	13½	4	83
22	A. R. Strauss, Monarto South	Ford	24	24	18	13	3½	82½
23	C. F. Altmann, Monarto South	Ranee	27	19	18	13½	4	81½
24	Pearson Bros., Brinkley	Ranee	25	21	18	13	3¾	80¾
25	P. B. Frahn & Sons, Monarto	Sword, Dundee	25	22	17	13	3½	80½
	D. B. Warren, Angas Plains	Waratah, Ford	30	21	14	12	3½	80½
27	Geo. Cross, Belvidere *	Sword	20	23	19	14	4	80
28	E. T. and L. Jaensch, Hartley	Sword	25	20	18	12½	4	79½
29	T. O. Ramm, Caloote	Nabawa	21	22	19	13	3½	78½
30	G. W. Faehrmann, Mannum	Ranee	22	21	18	13	4	78
31	Mrs. E. Hartmann, Monarto South	Ranee, Sword	23	20	18	13	3¾	77¾
32	N. W. Bormann, Millendilla	Bobin, Currawa	22	21	18	13	3½	77½
	E. L. Brown, Callington	Nabawa	21	22	19	12	3½	77½
34	A. B. Jaensch, Hartley	Sword	21	22	18	13	3	77
35	C. A. Whittlesea, Langhorne's Creek	Ranee, Sword	23	21	17	12½	3¼	76¾
36	H. A. Hein, Pallamana	Sword, Dundee	22	20	17½	13	3½	76
37	A. B. Jaensch, Hartley	Nabawa	21	20	18	13½	3	75½
38	H. E. Rosenzweig, Millendilla	Nabawa, Ranee	18	20	19	13½	4	74½

RESULTS OF WHEAT CROP COMPETITIONS—continued.

Position.	Name and Address of Competitor.	Variety.	Apparent Yield.	Freedom from Weeds.	Freedom from Disease.	Trueness to Type.	Evenness of Crop.	Total.
		Maxima—	35	25	20	15	5	100
	SOUTHERN—continued.							
39	S. Bretag, Mannum	Dundee, Ranee Nabawa	17	21	19	13½	3½	74
	G. J. Hartmann, Monarto South	Sword, Waratah	23	20	17	11	3	74
41	B. R. W. Lindner, Palmer	Bobin, Ranee, Dundee	19	20	18	13	3½	73½
42	Hugo Paech, Rockleigh	Sword, Dundee	16	21	19	14½	3	73½
43	S. C. Crawford, Strathalbyn	Dundee	23	17	16	14	3	73
	G. W. Faehrmann, Mannum	Baringa, Sword	18	21	17	13½	3½	73
	C. F. Altmann, Monarto South	Sword	20	18	18	14	3	73
46	Mrs. E. Hartmann, Monarto South	Dundee	19	20	17	13	3½	72½
47	O. E. Rosenzweig, Millendilla	Waratah, Aussie	18	20	17	13	4	72
48	S. Bretag, Mannum	Ranee, Sword	15	19	18	14	3½	69½
49	J. M. Hudd, Bletchley	King's White, Waratah	18	16	19	12	3	68
	FAR NORTHERN. Judged by E. L. ORCHARD, District Agricultural Adviser.							
1	E. H. Hampel, Terka	Dundee	33	24	19	14	4	94
2	J. M. Modystach, Wilmington	Dundee	33½	22½	19	13	4	92
3	J. G. Schuppan, Terka	Dundee	33½	24	17	12½	4	91
4	E. H. Hampel, Terka	Ranee 4H, Sword	32	24	19	13	2½	90½
5	T. F. Orrock, Wepowie	Sword, Ranee 4H	30	23	19	14	3	89
6	T. F. Orrock, Wepowie	Dundee, Ranee 4H	28½	23	19	14	3½	88
	J. F. W. Roocke, Wepowie	Ranee 4H	32	21	19	13	3	88
8	I. G. Schulz, Terka	Baringa, Dundee, Sword	29½	23	19	13	3	87½
9	H. G. Kupke, Morchard	Ranee 4H	29	23	19	13	3	87
10	Gregurke & Burns, Wepowie	Merridin	29	22	18½	13	4	86½
11	J. M. Modystach, Wilmington	Sword, Gluyas, Ceylon	32	22	16	13	3	86
	M. H. Modystach, Wilmington	Sword	33	21	16	14	2	86
	B. S. McCallum, Morchard	Early Gluyas, Ranee 4H	27	24	19	13	3	86
14	H. G. Kupke, Morchard	Dundee	27½	23	19	13	3	85½
	E. H. Schulz, Terka	Sword, Waratah	33	20	17	12½	3	85½
16	J. S. Hill, Wilmington	Dundee, Ranee	32	20	19	11	3	85
	Duhring Bros., Wilmington	Ranee	30	21	18	14	2	85
	J. G. Schuppan, Terka	Waratah	32	21	16	12	4	85
19	W. G. Gregurke, Wepowie	Felix, Dundee	28	22	19	13	2	84
	D. G. George, Wilmington	Sword, Ranee 4H	30	22	17	13	2	84
21	I. G. Schulz, Terka	Ranee, Waratah	33	19	16	11	4	83

RESULTS OF WHEAT CROP COMPETITIONS—continued.

Position.	Name and Address of Competitor.	Variety.	Apparent Yield.	Freedom from Weeds.	Freedom from Disease.	Trueness to Type.	Evenness of Crop.	Total.
		Maxima—	35	25	20	15	5	100
	NORTHERN YORKE PENINSULA.							
	Judged by O. Bowden, District Agricultural Adviser.							
1	R. C. Honner, Arthurton	Geeralying	32	21	19½	14	4	90½
2	M. K. Lamming, Paskeville	Sword	30	23	19	14	4	90
3	G. E. and H. E. Meier, Paskeville	Sword	30	21	19½	14	4½	89
	C. Rodda, Thrington	Dundee	28	23	19½	14	4½	89
5	Heinrich Bros., Bute	Dundee	29	22	18½	14½	4½	88½
6	H. J. Daniels, Melton	Dundee	27	24	19	13½	4½	88
	G. Rodda, Thrington	Waratah	27	24	19	13½	4½	88
8	J. H. Robertson, Arthurton	Dundee	28	22	19	13	4	86
9	O. D. Jericho, Arthurton	Ford	28	21	18½	14½	3½	85½
10	J. N. Abbott, Paskeville	Dundee	27	22	19	13	4	85
11	J. C. Westbrook, Arthurton	Dundee, Ford	27	21½	18½	13	4½	84½
12	T. Rodda, Thrington	Sword	26	22½	17	14	4	83½
	M. E. Bussenchutt, Paskeville	Sword	26	21	18½	14	4	83½
	R. S. Bussenchutt, Paskeville	Ford, Dundee, Waratah	26	21	19	14	3½	83½
	J. S. Henderson, Arthurton	Dundee	25	22	19	13½	4	83½
16	G. H. and S. D. Lamshed, Cunliffe	Dundee	27	20½	19	12½	4	83
17	J. H. Price & Sons, Paskeville	Sword	28	18	18½	13½	4	82
	J. H. Price & Sons, Paskeville	Bencubbin	27	19	19	13	4	82
19	J. E. Barton, Paskeville	Waratah, Bencubbin	26	20	17	13	4	80
20	T. A. Stanway, Kadina	Bencubbin	24	20½	18½	12	3½	78½
21	F. P. Price, Thrington	Waratah	26	19	15	14	4	78
22	M. D. Wright, Cunliffe	Sword	20	21	19	13½	4	77½
23	N. J. Cross, Kadina	Bencubbin	24	17½	19	13	3½	77
24	N. J. Cross, Kadina	Ranee	25	18½	18	10	3½	75
25	A. M. Tribbeck, Arthurton	Aussie, Ranee	20	19	18	13	3	73
	MID YORKE PENINSULA.							
	Judged by O. Bowden, District Agricultural Adviser.							
1	E. F. Heinrich, South Kilkerran	Sword	28	23½	19½	13	4	88
2	E. F. Heinrich, South Kilkerran	Dundee	28	22	19½	13½	3½	86½
3	W. A. Heinrich, South Kilkerran	Sword, Dan	26	23	19½	13	4	85½
4	O. H. Heinrich, South Kilkerran	Ford	25	22	19½	14½	4	85
5	S. W. A. Heinrich, Maitland	Geeralying, Bencubbin	25	20½	19	14	3½	82
	O. B. Linke, South Kilkerran	Sword	24	22	19½	13	3½	82
	H. O. Linke, South Kilkerran	Sword	27	20	18½	12½	4	82
8	E. H. R. Dutschke, South Kilkerran	Bencubbin	20	22½	19½	14	4	80
9	R. E. Hasting, South Kilkerran	Ranee 4H	19	21	19½	14	4½	78
	SOUTHERN YORKE PENINSULA.							
	Judged by O. Bowden, District Agricultural Adviser.							
1	L. Boundy, Minlaton	Waratah	35	23½	17	14	4	93½
2	O. Bittner, Curramulka	Bencubbin, Dundee	31	21½	19½	14	4	90
3	T. Fletcher, Minlaton	Sword	30	22½	19½	13½	3½	89
	H. H. Glazbrook, Minlaton	Sword, Ranee	32	24	16½	13	3½	89
5	H. H. McBurney, Curramulka	Ranee 4H	32	19	19	13	4½	87½
6	H. Polkinghorne, Minlaton	Sword	30	21½	18	13½	4	87
7	E. H. Giles & Son, Yorketown	Sword, Baringa	25	24	19	14	4	86

RESULTS OF WHEAT CROP COMPETITIONS—continued.

Position.	Name and Address of Competitor.	Variety.	Apparent Yield.	Freedom from Weeds.	Freedom from Disease.	Trueness to Type.	Evenness of Crop.	Total.
		Maxima—	35	25	20	15	5	100
	NORTHERN							
	Judged by E. L. ORCHARD, District Agricultural Adviser.							
1	J. Rucioch, Laura	Ranee 4H, Baringa	34	22½	19	13	5	93½
2	J. C. Kleinig, Laura	Dundee	32	22	20	14½	4	92½
3	B. B. Moy, Jamestown	Nabawa	31	24	19	14	4	92
4	J. E. Lehmann, Caltowie	Bencubbin	32	24	17	14	4½	91½
5	L. Downing, Jamestown	Ranee 4H	32½	22½	19	13	4	91
	J. W. Prior, Gladstone	Ranee 4H	34	21½	18	13	4½	91
7	P. Curtin, Beetaloo Valley	Bobin	33	22	19	12½	4	90½
8	Amey Bros., Caltowie	Bencubbin	30	22	20	14	4	90
	C. H. Martin, Georgetown	Bencubbin	32	23	17	14	4	90
10	J. E. Pech, Laura	Ranee 4H	31½	24	19	11	4	89½
	C. J. and G. H. Woolford, Wirrabara	Ranee 4H	35	22	16½	13	3	89½
12	Smith Bros., Laura	Waratah, Baringa, Dundee	33	21	19	13	3	89
	R. E. Woolford and P. Blesing, Wirrabara	Early Sepoy	35	23	16	12	3	89
	Hollitt & McKenzie, Wirrabara	Dundee	34	23	16	13	3	89
	Blieschke Bros., Melrose	Ranee 4H	32	22	19	13	3	89
	Blieschke Bros., Melrose	Ranee 4H, Baringa	32	22	19	13	3	89
	L. H. Kelly, Yandiah	Ranee, Ranee 4H	33	22	19	12	3	89
18	W. C. and F. L. Jettner, Yandiah	Dundee	31½	23	19	12	3	88½
	H. R. Lines, Laura	Dundee, Sword	31½	22½	18	12½	4	88½
20	E. T. Cooper, Jamestown	Dundee	32	22	18	13	3	88
	P. Curtin, Beetaloo Valley	Dundee, Bencubbin	33	22	17	12	4	88
	N. W. Royal, Caltowie	Bencubbin	31	20	19	14	4	88
	Amey Bros., Caltowie	Dundee	30	23	19	12	4	88
	W. L. Staker, Gladstone	Bobin	31	21	20	12	4	88
25	J. R. Deer, Wirrabara	Ghurka, Dundee, Baringa	32	23	19	11½	2	87½
26	M. T. Lynch, Wirrabara	Ranee 4H	34	22	17	11	3	87
	J. and T. Reichstein, Laura	Bobin	32	20	19	11	5	87
28	Sargent & Son, Gladstone	Bobin	29	22	19	13	3½	86½
29	W. F. Wurst, Laura	King's White, E. African	34	20	16	13	3	86
30	A. R. Keller, Yandiah	Ranee 4H	31½	22	18	12	2	85½
31	J. A. Halse, Beetaloo Valley	Bencubbin	30	21	17	14	2½	84½
32	J. L. Potter, Gladstone	Bobin	28	21	19	12	2½	82½
	MID NORTHERN							
	Judged by E. L. ORCHARD, District Agricultural Adviser.							
1	H. A. Zweck, Hart	Ford	34	24½	19	14	4½	96
2	A. S. Kirk, Merriton	Ford	34	24	17	14	4	93
3	Spencer Bros., Koolunga	Felix	32	24	18½	14	4	92½
4	J. L. Howard, Yacka	Ford	32½	24	18	13	4	91½
5	F. J. Pedler, Koolunga	Bencubbin	30	24	19	14	4	91
	W. P. R. Simon, Halbury	Sword	32	23	18	14	4	91
	M. Smart & Son, Gulnare	Merridin, Sword	35	24	16	11	5	91
	M. Smart & Son, Gulnare	Bencubbin	33	24	17	13	4	91
9	A. L. McEwin, Hart	Dundee	31½	23	19	13	4	90½
10	J. L. Noonan, Gulnare	Bencubbin, Sword	34	21	17	13	5	90

RESULTS OF WHEAT CROP COMPETITIONS—continued.

Position.	Name and Address of Competitor.	Variety.	Apparent Yield.	Freedom from Weeds.	Freedom from Disease.	Trueness to Type.	Evenness of Crop.	Total.
		Maxima—	35	25	20	15	5	100
	MID NORTHERN—continued.							
	E. E. Richards, Narridy	Sword	32	24	16	14	4	90
	A. V. Crouch, Redhill	Waratah, Ranee 4H	33	22	19	12	4	90
	E. H. Bentley, Koolunga	S.H.J.	30	24	19	14	3	90
14	H. E. Zweck, Hart	Dundee	32½	23	19	11	4	89½
	Alex Maitland, Rochester	Nabawa	32	22	19	13	3½	89½
	E. H. Ottens, Brinkworth	Bencubbin	30	22	19½	14	4	89½
17	E. E. Richards, Narridy	Carrabin	32	22	19	13	3	89
	Alex Maitland, Rochester	Ranee 4H	33	22	18	13	3	89
19	A. V. Crouch, Redhill	Bobin	33	21	18	13	3½	88½
20	P. S. O'Shaughnessy, Crystal Brook	S.H.J.	32	19½	19	13	4½	88
	L. H. Weckert, Hoyleton	Dundee	33	23	17	11	4	88
22	E. D. Whitehorn, Koolunga	Sword, Dundee	28½	24	18	13	4	87½
23	Alex Maitland, Rochester	Dundee	31½	21	19	12	3½	87
24	E. E. Lang, Georgetown	Nabawa	32	22	16	13	3	86
	F. J. Pedler, Koolunga	Dundee	29½	23	17	13	3½	86
	C. T. Behenna, Koolunga	Dan	31	22	18	12	3	86
27	A. A. Bentley, Redhill	Waratah	29½	22	18	13	3	85½
	C. T. Behenna, Koolunga	Bencubbin	32	20	18	12	3½	85½
29	E. S. Sheidow, Koolunga	Dundee	29	21	19	12	4	85
30	H. E. Weckert, Koolunga	Dundee	29	22	18	12	3½	84½
31	H. S. & O. S. Freeman, Koolunga	Dundee	31	20	18	12	3	84
	Button Bros., Koolunga	Dundee	29	22	18	11½	3½	84
33	E. E. Lang, Georgetown	Nabawa, Ranee 4H	32	21	16	11	3½	83½
	H. S. & O. S. Freeman, Koolunga	Sword	32	20	16	12	3½	83½
35	Button Bros., Koolunga	Ghurka	29	22	17	11	3½	82½
	CHANDOS.							
	Judged by R. L. GRIFFITHS, District Agricultural Adviser.							
1	L. J. T. Foale, Parilla	Ranee 4H	32	24½	20	14	4½	95
2	C. E. Koch, Lameroo	Gallipoli	32	23½	19½	14	4	93
3	F. A. Meagher, Pinnaroo	Sepoy	31	22½	20	14½	4½	92½
4	G. E. Harding, Parilla	Bobin	30	24	19½	14½	4	92
5	L. A. and L. J. Sheldon, Pinnaroo.	Gallipoli	31	23½	18½	14	4½	91½
	F. H. Whittlesea, Jabuk	Bencubbin	30	24	19	14½	4	91½
7	A. J. Beelitz, Parrakie	Baringa	31	24	17½	14½	4	91
8	M. R. Hentschke, Parilla	Ranee 4H	29½	23½	18½	14½	4½	90½
9	Young & Blacksell, Pinnaroo	Gallipoli	29	23½	19½	14½	3½	90
	R. C. Kerley, Parilla	Bobin, Ranee 4H	30½	22	19½	14½	3½	90
	R. N. Neindorf, Parilla	Bobin	31	22	19	14	4	90
	W. J. Ross, Parrakie	Dundee	28	25	18½	14½	4	90
13	E. M. Morcom, Lameroo	Sword, Waratah	30	22	19	14	4½	89½
	E. S. Ross, Parrakie	Sword	28	24½	18½	14½	4	89½
	Przibilla Bros., Parrakie	Silver Bart	28	24½	18½	14½	4	89½
16	R. C. Kerley, Parilla	Bena	30	21½	19	14½	4	89
	G. A. McCormack, Parilla	Waratah	28	23½	19	14½	4	89
18	Young & McInerney, Pinnaroo	Waratah	28	22½	19	14½	4½	88½
	H. E. Vogt, Pinnaroo	Sword	29	22½	19½	14	3½	88½
	M. R. Hentschke, Parilla	Gluyas	28	23½	18½	14	4½	88½
	H. J. H. Both, Wilkawatt	Waratah	29	22	18½	14	5	88½
	P. S. Tonkin, Lameroo	Ranee 4H	28	23½	18½	14½	4	88½
23	C. H. B. Ross, Pinnaroo	Sword	28	22	19½	14½	4	88
	A. J. A. Koch, Lameroo	Bencubbin	27	22½	19½	14½	4½	88
25	A. L. Barrett, Lameroo	Ranee 4H	28	22½	18½	14½	4	87½
26	H. W. Harrip, Parilla	Waratah	25	23½	19½	14½	4½	87

RESULTS OF WHEAT CROP COMPETITION—continued.

Position.	Name and Address of Competitor.	Variety.	Apparent Yield.	Freedom from Weeds.	Freedom from Disease.	Trueness to Type.	Evenness of Crop.	Total.
		Maxima—	35	25	20	15	5	100
	CHANDOS—continued.							
	J. H. and C. H. Spratt, Lameroo	Dundee	26	22½	19½	14	5	87
	P. Ross, Parrakie	Silver Bart	27	22½	18½	14½	4½	87
29	A. G. Johnston, Pinnaroo	Ranee 4H	27	22	19½	14	4	86½
	W. H. Cabot, Parrakie	Silver Bart, Sword	26	24	18½	14	4	86½
31	L. R. Mattiske, Pinnaroo	Sword	25	22½	19½	14	5	86
	J. F. Hutchens, Parilla	Waratah	26	21½	19	14½	5	86
	A. J. A. Koch, Lameroo	Sultan	26	21½	19½	14½	4½	86
34	Max C. Dabinett, Parilla	Waratah, Bena	27	21½	19	14	4	85½
	J. L. Koch, Lameroo	Waratah	25	22½	19	14½	4½	85½
	D. A. Wurfel, Pinnaroo	Ghurka	25	23	19½	14½	3½	85½
37	R. L. Austin, Pinnaroo	Ghurka	26	21½	19½	14	4	85
38	E. R. McBurney, Parrakie	Sword	27	21½	17½	14½	4	84½
39	R. F. Inglis, Pinnaroo	Ranee	24	22	19½	14	4	83½
	Foale & Sons, Parilla	Ranee 4H	24	22½	18½	14½	4	83½
41	H. L. Billing, Lameroo	Ranee 4H	23	22½	19	14	4	82½
	H. H. Brooker, Wilkawatt	Ranee	24	22	18½	14	4	82½
	C. W. Lehmann, Lameroo	Sword	21	23	20	14	4½	82½
	J. L. Byrne, Lameroo	Gluyas	23	22½	19	14	4	82½
45	L. C. Fischer, Pinnaroo	Ghurka	21	21	18	14	4½	78½
	CHANDOS JUNIOR.							
1	L. E. Vogt, Pinnaroo	Sword, Ranee 4H	30	22½	19½	14	3½	89½
2	A. L. Barrett, Lameroo	Ranee 4H	28	24	18½	14½	4	89
3	Alan Hutchens, Parilla	Waratah	26	21½	19	14½	5	86
4	Max C. Dabinett, Parilla	Bena, Waratah	27	21½	19	14	4	85½
5	L. T. Kakoschke, Lameroo	Ranee 4H, Sword	25	23½	17½	14	4	84
6	E. J. L. Slater, Pinnaroo	Ghurka	23	22	19½	13½	4	82
	TATIARA Judged by E. S. ALCOCK, District Agricultural Adviser.							
1	J. E. K. Ridgway, Wolseley	Dundee	34½	25	19	15	5	98½
2	E. W. Sharrad, Wolseley	Dundee	34	25	19½	15	4½	98
3	Fisher Bros., Bordertown	Dundee	33	24½	19½	15	4½	96½
4	E. J. Buckley, Bordertown	Dundee, Ghurka	33½	24	19	14½	4	95
5	H. C. M. Pilgrim, Wolseley	Dundee	32½	23	19	14½	4	93
	J. B. Smith, Bordertown	Dundee	33	24	19	14	3	93
	L. Y. Langdon, Bordertown	Ranee	32	24	18½	14½	4	93
8	Tilley Bros., Bordertown	Dundee	33	23	18½	14	3	91½
9	J. T. Buckley, Wolseley	Dundee	33	22½	18	14	3	90½
	A. E. England, Bordertown	Bencubbin	32	23½	16	14	5	90½
	D. R. Milne, Bordertown	Ranee	32	22	18½	14	4	90½
12	J. H. Tilley, Bordertown	Ranee	32½	23	18½	13	3	90
13	J. E. McDonald, Bordertown	Ghurka	33	21½	18	13½	3	89
14	J. B. Smith, Bordertown	Ghurka	32	21	19	13½	3	88½
15	R. A. Grosser, Wolseley	Gallipoli, Ghurka	32	22	15	13½	4	86½
16	H. A. Hausler, Bordertown	Dundee, Ghurka	31	20	18	14	3	86
	A. E. and E. B. Milne, Bordertown	Ghurka	30	20	18½	13	4½	86
18	S. Pitcher, Bordertown	Ranee	30	21	18	13½	3	85½

Advisory Board

At the invitation of the Principal (Dr. A. R. Callaghan), a meeting of the Advisory Board of Agriculture was held at Roseworthy Agricultural College on the 24th November, there being present:—Sir Wallace Sandford (Chairman), Messrs. F. Coleman, A. M. Dawkins, R. H. Martin, Prof. A. J. Perkins, O.B.E., Dr. A. E. V. Richardson, A. J. Cooke, S. Shepherd, J. B. Murdoch, W. J. Spafford, and H. C. Pritchard (Secretary). Apologies were received from Hon. A. L. McEwin, M.L.C., Messrs. P. J. Baily, H. N. Wicks, A. J. A. Koch, and C. A. Loxton.

Resignation of Mr. A. J. Cooke.—Mr. Cooke reported that in consequence of his appointment as General Manager of the Colac Dairying Company, Victoria, he had tendered his resignation as a member of the Board to the Hon. Minister of Agriculture. Members congratulated Mr. Cooke on his new appointment, and expressed their sincere regret that the valuable services which he had given to the dairying industry were being lost to this State.

New Branch.—Approval was given to the formation of a Women's Branch at Charra with 17 foundation members.

New Members.—The following new members of the undermentioned Branches were approved:—Adelaide—H. J. Mills, W. S. McAuliffe; Alawoona Women's—Mrs. J. Whitehead, Mrs. S. Blatchford; Auburn Women's—Mrs. R. Chapman, Mrs. A. Farquarson, Mrs. E. Kirkbright; Balaklava—Volney Whiting; Balhannah—W. W. Miller, R. W. Miller; Balumbah—F. V. Jericho; Barmera—A. H. Leak, W. G. Rogers, E. H. Crocker, J. Irwin; Beetaloo Valley Women's—Miss Lorna Pearce; Berri—F. V. H. Magaard, N. L. James, C. Plush; Black Springs—Stan. Harding; Booborowie—A. J. Nettle, E. J. Affolter; Brentwood—A. A. Prater; Bute—J. G. Mohr, E. Janz, W. D. McDonald, R. O'Loughlin, A. Lamming, E. W. Bettess, H. E. Bettess; Chandada—Fredk. Harder, Thos. Evans; Clarendon—Brice Nicolle, Vernon Smart; Coonawarra—E. A. Childs; Cudlee Creek—L. Ballams, C. G. Hannaford, C. A. Parasiers, C. J. Symonds, F. Appledore, J. Peters, E. Chamberlain, K. Verrall, A. C. Bourne, C. G. Gall; Echunga Women's—Mrs. W. G. Porteous, Miss Page; Eurelia Women's—Mrs. J. Read; Gawler River—R. Hook; Georgetown Women's—Mrs. W. Dowd, Mrs. M. Fogarty, Miss Lyons; Glencoe—Snibson; Jamestown—E. H. Orchard, J. O. Hatter; Kangarilla Women's—Mrs. H. Biddle; Keith—B. Jones, A. Howe, R. J. Moseley, D. Moseley, A. J. Densley, L. H. Densley, H. Densley, R. W. Taylor, C. Densley, A. Hill, W. H. Hill, G. Hill; Kelly—Jack Lambell, Harry Chapman; Kybybolite—B. H. Crawford, H. M. Johnson, W. F. Staude, P. Heffernan; Laura Bay Women's—Miss D. B. Doecke, Miss Alicia H. Barnett, Miss D. M. Edson, Mrs. H. M. Chandler; Lenswood and Forest Range—A. E. Waters, Ron. Norton; Lone Pine—M. John, S. L. Hoffmann, G. Braunach, A. Milde; Mangalo Women's—Miss H. Hannemann; McLaren Flat Women's—Mrs. Fred Penney, Miss Kathleen Bagshaw, Miss Ruth Kyloh, Mrs. J. Bruce; Monarto South—S. Martin; Mount Compass—A. C. Killmier; Murray Bridge—A. A. Jaensch; Myponga Women's—Miss C. Magor; Narridy—T. R. Wellbourne; Parilla Women's—Miss D. Phillis; Parrakie Women's—Miss S. Gravestocks, Miss M. Gravestocks; Penola Women's—Mrs. Jas. O'Connor; Pinnaroo Women's—Mrs. W. Wilson; Saddleworth—E. Garrett, A. J. Caskey, A. R. Bagshaw, K. Bagshaw, L. Bagshaw; Sheoak Log Women's—Mrs. H. G. Argent, Miss J. Argent, Mrs. P. Dahlenburg, Miss M. Dahlenburg, Mrs. C. Mattiske, Mrs. K. Horsnell; Truro—H. M. Rosenzweig; Wepowie—K. A. Elliott; Wepowie Women's—Mrs. Ed. Roocke; Wirrabara—R. G. T. Edwards; Wirrilla—Ray Tickle, Stan. Schunke.

New Branch.—Charra Women's—Miss D. Rice, Mrs. E. A. Denton, Miss E. Denton, Miss R. Denton, Mrs. A. Brown, Miss D. Brown, Miss E. Brown, Miss T. Brown, Miss E. Mewett, Mrs. E. T. Mewett, Miss W. Borlase, Mrs. E. M. Borlase, Miss N. West, Mrs. A. R. Haseldine, Mrs. W. B. Haseldine, Mrs. E. J. Schultz, Miss Mary E. Haseldine.

Several resolutions from Conferences and branches were dealt with.

Rainfall Table

The following figures, from data supplied by the Commonwealth Meteorological Department, show the rainfall of the subjoined stations for the month and to the end of November, 1937; also the average precipitation for November, and the average annual rainfall.

Station.	For Nov., 1937.	Av'ge. for Nov.	To end Nov. 1937.	Av'ge. Annual Rain-fall.
FAR NORTH AND UPPER NORTH.				
Oodnadatta	0·18	0·34	1·41	4·60
Marree	3·07	0·43	6·21	5·80
Farina	1·89	0·47	8·21	6·37
Copley	2·14	0·55	7·54	7·76
Beltana	2·16	0·66	9·50	8·39
Blinman	1·45	0·85	12·50	11·71
Hookina	2·45	0·83	12·29	10·94
Hawker	1·95	0·90	14·54	12·09
Wilson	1·93	0·86	13·44	11·65
Gordon	1·98	0·79	12·45	10·23
Quorn	1·41	0·87	16·14	13·10
Port Augusta	2·35	0·68	12·61	9·40
Bruce	1·82	0·71	13·75	9·74
Hammond	1·77	0·75	13·04	11·05
Wilmington	2·41	0·98	21·79	17·18
Willowie	2·01	0·77	13·90	12·10
Melrose	3·09	1·23	23·89	22·80
Booleroo Centre	4·16	0·84	18·97	15·14
Port Germein	1·67	0·78	13·72	12·51
Wirrabara	2·38	1·08	23·97	19·22
Appila	2·61	0·91	17·11	14·59
Cradock	2·55	0·73	18·47	10·67
Carrieton	2·30	0·79	13·48	12·11
Johnburg	1·31	0·81	13·82	10·49
Eurelia	2·33	0·94	14·53	12·66
Orroroo	2·29	0·94	15·67	13·12
Nackara	1·30	0·85	21·03	11·09
Black Rock	0·74	0·91	11·69	12·26
Oodlawirra	1·62	0·91	14·08	11·34
Peterborough	1·14	0·97	11·12	13·14
Yongala	0·96	1·02	14·84	14·37
NORTH-EAST.				
Yunta	0·85	0·77	12·44	8·44
Waukaringa	1·28	0·67	10·64	7·82
Mannahill	0·93	0·75	10·77	8·08
Cockburn	0·15	0·75	9·59	7·81
Broken Hill	0·40	0·75	8·42	9·40
LOWER NORTH.				
Port Pirie	2·23	0·76	15·22	13·18
Port Broughton	2·50	0·71	16·35	13·87
Bute	1·98	0·77	16·91	15·42
Laura	3·04	1·03	18·31	17·93
Caltowie	1·80	1·09	22·41	16·69
Jamestown	0·80	1·12	17·46	17·68
Gladstone	2·95	1·02	17·52	16·31
Crystal Brook	2·47	0·89	18·47	15·79
Georgetown	1·89	1·00	16·77	18·24
Narridy	2·46	0·86	19·30	15·74
Red Hill	2·14	0·86	19·30	16·55
Spalding	0·94	1·08	16·28	18·68
Gulnare	1·54	1·04	18·21	18·51
Yacka	1·77	0·83	17·36	15·38
Koolunga	2·44	0·79	16·18	15·29
Snowtown	1·60	0·86	17·67	15·69
LOWER NORTH—*continued.*				
Brinkworth	1·53	0·82	17·50	15·72
Blyth	0·92	0·90	18·05	16·73
Clare	1·52	1·28	26·38	24·43
Mintaro	1·42	1·12	25·94	23·30
Watervale	1·57	1·37	28·85	26·69
Auburn	1·21	1·31	22·67	23·92
Hoyleton	1·06	1·01	18·94	17·25
Balaklava	0·87	0·92	18·02	15·41
Port Wakefield	1·84	0·71	16·66	12·93
Terowie	1·74	0·91	15·25	13·27
Whyte-Yarcowie	1·91	0·89	15·45	13·54
Hallett	2·00	1·03	18·19	16·39
Mount Bryan	1·71	0·87	19·47	16·76
Kooringa	1·66	0·91	20·04	17·78
Farrell's Flat	1·78	0·92	22·26	18·52
WEST OF MURRAY RANGE.				
Manoora	1·07	0·97	19·11	18·91
Saddleworth	0·94	1·12	22·04	19·56
Marrabel	0·93	1·09	21·44	19·91
Riverton	0·88	1·20	21·66	20·79
Tarlee	0·77	1·11	17·32	18·06
Stockport	1·17	1·04	17·67	17·02
Hamley Bridge	0·95	0·95	15·64	16·52
Kapunda	0·88	1·12	16·63	19·74
Freeling	0·80	1·04	13·51	17·79
Greenock	1·03	1·25	17·02	21·47
Truro	1·18	1·13	16·35	19·75
Stockwell	1·69	1·20	16·78	20·02
Nuriootpa	1·11	1·14	19·05	20·74
Angaston	1·25	1·26	19·93	22·33
Tanunda	1·20	1·19	19·19	21·97
Lyndoch	0·83	1·19	19·05	23·28
Williamstown	1·24	1·36	22·80	27·54
ADELAIDE PLAINS				
Owen	1·21	0·79	19·85	14·78
Mallala	0·83	0·93	13·64	16·43
Roseworthy	1·21	1·00	14·66	17·43
Gawler	1·25	1·03	16·58	18·85
Two Wells	1·20	0·84	13·64	15·80
Virginia	1·34	0·95	16·42	17·22
Smithfield	1·44	1·01	18·69	17·68
Salisbury	1·50	1·02	18·49	18·55
Adelaide	1·39	1·14	20·79	21·17
Glen Osmond	2·05	1·22	24·52	25·96
Magill	1·49	1·23	24·14	25·37
MOUNT LOFTY RANGES				
Teatree Gully	2·10	1·45	25·39	27·03
Stirling West	2·64	2·12	45·64	47·01
Uraidla	2·17	1·90	40·26	43·83
Clarendon	1·56	1·54	28·51	32·81
Happy Valley Res.	1·34	—	22·43	—
Morphett Vale	1·33	1·21	23·01	22·62
Noarlunga	1·57	1·02	22·74	20·35
Willunga	1·17	1·21	22·33	25·96
Aldinga	1·34	0·95	19·47	20·21

RAINFALL—*continued.*

Station.	For Nov., 1937.	Av'ge. for Nov.	To end Nov., 1937.	Av'ge. Annual Rain-fall.
MOUNT LOFTY RANGES—*continued.*				
Myponga	1·08	1·38	27·21	29·72
Inman Valley	1·34	—	25·92	—
Yankalilla	1·06	1·06	20·86	22·78
Mount Compass	0·68	1·88	27·26	36·25
Mount Pleasant	1·18	1·29	22·18	27·08
Birdwood	1·14	1·39	24·87	29·02
Gumeracha	1·76	1·64	30·12	33·28
Millbrook Reservoir	1·95	1·56	34·03	34·50
Lobethal	1·72	1·59	35·19	35·94
Woodside	1·46	1·48	29·74	32·16
Hahndorf	1·70	1·58	29·64	34·82
Nairne	1·41	1·39	23·23	28·14
Mount Barker	1·42	1·49	25·84	31·24
Echunga	2·24	1·58	29·63	33·30
Macclesfield	1·68	1·64	22·86	30·37
Meadows	1·67	1·85	30·24	36·02
Strathalbyn	1·19	1·07	16·71	19·34
MURRAY FLATS AND VALLEY.				
Meningie	0·61	1·02	14·80	18·29
Milang	0·90	0·90	11·50	14·85
Langhorne's Creek	0·99	1·01	12·96	14·93
Wellington	0·86	0·92	12·98	14·66
Tailem Bend	0·65	0·91	13·43	15·07
Murray Bridge	0·64	0·86	8·94	13·49
Callington	0·89	0·90	10·57	15·14
Mannum	0·72	0·69	10·33	11·49
Palmer	0·96	0·90	14·41	15·63
Sedan	0·84	0·69	11·51	12·01
Swan Reach	0·64	0·68	9·74	10·62
Blanchetown	0·76	0·71	9·72	10·95
Eudunda	1·25	1·06	17·11	17·13
Point Pass	1·61	0·74	19·22	16·66
Sutherlands	1·12	0·76	15·39	10·71
Morgan	0·58	0·63	10·04	9·10
Waikerie	1·55	0·64	10·53	9·59
Overland Corner	0·48	0·76	8·96	10·18
Loxton	0·36	0·68	9·74	11·34
Berri	0·34	0·53	10·78	10·03
Renmark	1·00	0·72	11·50	10·33
WEST OF SPENCER'S GULF.				
Eucla	1·33	0·66	7·94	10·08
Nullarbor	0·74	0·56	5·53	8·87
Fowler's Bay	2·17	0·59	10·15	11·93
Penong	2·88	0·60	12·77	12·28
Koonibba	1·59	0·68	11·90	12·18
Denial Bay	2·11	0·60	11·77	11·33
Ceduna	2·63	0·64	10·34	10·32
Smoky Bay	1·93	0·54	10·79	10·50
Wirrulla	1·79	0·58	13·80	10·87
Streaky Bay	2·50	0·67	16·07	14·91
Chandada	1·90	0·73	14·07	12.66
Minnippa	2·28	0·72	14·15	13·97
Kyancutta	2·09	0·75	12·98	13·45
Talia	2·90	0·67	16·45	14·76
Port Elliston	1·02	0·70	16·54	16·53
Lock	1·50	0·98	14·41	16·44
Mount Hope	0·91	—	21·43	—
Yeelanna	0·72	0·67	15·19	16·11
Cummins	0·87	0·76	17·43	17·70
Port Lincoln	1·13	0·85	17·02	19·35
Tumby	1·20	0·86	10·84	14·29
Ungarra	1·44	0·94	15·76	16·94
Port Neil	1·42	0·87	9·61	13·16

Station.	For Nov., 1937.	Av'ge. for Nov.	To end Nov. 1937	Av'ge. Annual Rain-fall.
WEST OF SPENCER'S GULF—*continued.*				
Arno Bay	1·78	0·73	10·46	12·83
Rudall	1·26	0·95	12·28	13·23
Cleve	1·47	0·92	12·79	14·96
Cowell	1·36	0·68	8·00	11·06
Miltalie	0·80	0·87	13·85	13·75
Mangalo	1·22	0·83	10·77	13·86
Darke's Peak	0·95	0·78	15·59	15·24
Kimba	1·05	0·66	10·77	11·84
YORKE PENINSULA.				
Wallaroo	2·30	0·71	14·58	13·97
Kadina	2·00	0·73	16·27	15·59
Moonta	1·94	0·75	13·10	15·04
Paskeville	1·72	0·72	16·21	15·44
Maitland	1·54	1·00	19·56	19·86
Ardrossan	1·78	0·76	16·60	13·96
Port Victoria	2·45	0·82	15·79	15·39
Curramulka	1·48	0·85	15·79	17·81
Minlaton	2·11	0·91	16·27	17·72
Port Vincent	1·24	0·77	12·04	14·37
Brentwood	1·89	0·85	17·68	15·61
Stansbury	1·54	0·84	15·87	16·81
Warooka	1·71	0·79	15·86	17·44
Yorketown	2·00	0·85	15·88	16·88
Edithburgh	1·26	0·90	13·47	16·38
SOUTH AND SOUTH-EAST.				
Cape Borda	1·51	0·98	26·27	24·87
Kingscote	1·71	0·91	18·57	19·27
Penneshaw	1·56	1·02	19·32	19·18
Victor Harbour	1·08	1·09	20·57	21·43
Port Elliot	1·52	1·09	19·23	19·94
Goolwa	1·47	1·06	18·38	17·84
Maggea	0·98	0·49	10·15	10·02
Copeville	0·46	0·70	10·65	11·51
Claypans	0·83	0·50	11·26	10·53
Meribah	0·44	0·48	9·40	11·11
Alawoona	0·21	0·46	9·21	10·26
Caliph	0·46	0·57	11·56	10·44
Mindarie	0·54	0·75	11·09	12·13
Sandalwood	0·89	0·84	11·96	13·60
Karoonda	0·58	0·73	11·05	14·18
Pinnaroo	0·92	0·96	10·77	14·19
Parilla	0·61	0·83	11·65	13·64
Lameroo	0·72	0·94	11·94	15·79
Parrakie	0·32	0·82	11·58	14·61
Geranium	0·25	0·90	11·73	16·39
Peake	0·38	0·83	12·88	15·95
Cooke's Plains	0·62	0·88	13·67	15·29
Coomandook	0·46	1·03	12·86	17·03
Coonalpyn	0·35	1·01	16·19	17·65
Tintinara	0·56	1·14	16·57	18·72
Keith	0·41	1·13	16·20	17·96
Bordertown	0·24	1·21	16·04	19·14
Wolseley	0·20	1·11	15·63	18·47
Frances	0·21	1·26	15·62	20·12
Naracoorte	0·36	1·36	18·35	22·65
Penola	0·56	1·52	19·63	25·94
Lucindale	0·59	1·21	23·02	23·47
Kingston	0·65	1·20	17·67	24·24
Robe	0·70	1·06	23·89	24·65
Beachport	0·88	1·15	23·30	27·07
Millicent	0·97	1·45	26·72	29·87
Kalangadoo	1·39	2·00	24·25	32·05
Mount Gambier	0·85	1·73	18·31	30·34

Agricultural Bureau of South Australia

Reports Received from Branches.

The following is a list of Branch reports received during the month, and shows the date and principal subject of each meeting:—Allandale East, 15th October, Question Box. Appila Yarrowie, 5th November, address, G. S. Wurst. Balumbah, 24th October, Conference reports, paper, R. Clements. Berri, 15th November, Question Box. Blackheath, 18th November, paper from *Journal*. Black Springs, 19th October, visit to Lobethal. Boor's Plains, 4th November, "Fat Lambs," M. D. Wright. Brentwood, 5th October, "Care of Farm Horses," G. C. Boundy. Brimpton Lake, 3rd November, discussion. Butler, 25th October, Congress report. Cambrai, 3rd November, address, W. J. Spafford. Glencoe, 2nd November, "Potato Experiments," A. L. Warren. Green Patch, 18th November, address, H. D. M. Adams. Hartley, 17th November, paper from *Journal*. Keith, 8th November, re-organisation. Karte, 17th November, "Selecting a Binder," C. G. Roberts. Koonunga, 17th November, "Apple Growing." Kyancutta, 2nd November, discussion. Light's Pass, 15th November, "Wills and their Preparation," F. Blamey. Marama, 20th November, "The Sheep Dog," A. Rogers. McLaren Flat, 24th November, "Arid Regions of Australia," A. Warren. Miltalie, 8th November, "Improving our Older Farms," A. R. Smith. Monarto South, 13th November, "Trees," H. B. White. Murraminga, 30th October, Congress reports. Narridy, 6th November, address, J. A. Lyons, M.P. Penwortham, 13th October, address, C. J. Sandow; 10th November, "Spraying Hints," R. Knappstein. Roberts and Verran, four meetings. Rosedale, 9th November, social. Spalding, 29th October, "Fodder Conservation," E. L. Orchard. Truro, 17th November, Question Box. Waikerie, 20th September, "Bookkeeping," R. H. Hall. Wareowie, 19th October, "Farm Gates," A. F. Crossman. Warramboo, 7th October, discussion. Wirrabara, 22nd May, 19th June, 17th July, papers. Yadnarie, 19th October, 'Lime Burning," W. H. Pfitzner.

Papers Read at Conferences

Marketing our Dried Fruit

(Impressions gained by Mr. F. B. Wilson during a World Tour.)

[McLaren Flat Conference.]

During my visit to England I was privileged to see the method of sales of our dried fruits. All fruit is put through a fumigation process in barges before being allowed on the wharves. This means a lot of handling and is where some of the handling charges mount up. The barge, after getting its load from the ship, is covered and sealed from all water and air. Then the gas is weighed, allowing 1½-2lbs to every ton of fruit. The gas is forced into the air-tight barge and left for several hours. This method is proving satisfactory for the destruction of moth and grub in the fruit.

The fruit is then taken into store and samples are drawn. With parcels of up to 500 boxes, four are opened, and a sample of 2lbs. taken from each. In large consignments up to eight or 10 boxes are opened and samples taken from each box. These samples are sent half to the Appraisement Room and half to the agent handling the fruit. The fruit is then stacked in large stores and sprayed with an atomised spray which floats in the air like dust. This is to kill the odd moths that may have been missed or any stray moth that may be about the sheds or wharf. This treatment is claimed to have proved satisfactory and shows a decrease in infected fruit. The figures given are:—1933 (the first year of treatment of this kind) 5,000 cases had to be re-treated, 1934 1,500 re-treated; 1935 170, 1936 20, but no moth or grub was found, so they consider that the moth problem has been solved, although it is costly to the grower.

Buyers have no redress after the purchase has been completed as to faulty fruit or packing, except in very glaring cases. The buyer is allowed a discount of ¾ per cent. to 1 per cent. off the price paid, to allow for samples drawn, waste, etc. I saw some of McLaren Vale's fruit; this opened up well, both large and small samples.

The appraisement appears to me to be carried on quite fairly. I am assured that the A.D.F.A. has no preference over the Independent Packers, and no shed is known or considered in the appraisement, or given any preference as to sales. Mr. Scouler (Secretary to Board) explained that the position of the currant market was very weak, Greece being determined to try and capture the whole trade. This position is becoming dangerous to our Viticultural Industry, and requires careful handling if we are to enjoy a long period of prosperity. If we are to hold our present position, we will have to be prepared to compete on the lower values on which they propose operating. If we could increase our home markets another 10 or 15 per cent. this would enable us to carry on. The English currant market does not look very hopeful at present.

The appraiser (Mr. Caro) made a special effort to show me the method and the working of the Board. First he emphasized the fact that no preference was given to A.D.F.A. or Independent Packers. He personally did not know one or the other. All parties are on a level as regards appraisement and position of sales. Secondly, the board was not a price fixer, but aimed at the fruit being sold at fair value, after taking into consideration the price Greek fruit was being offered at. The appraised price was always open to re-adjustment if the agent handling the parcel found that too high a value had been placed on it to compete successfully on the market. He made a strong point that some of the agents did not put enough energy into their work, and so let their clients suffer. After having access to the appraisement sheets, showing the value put on and the buyers bid recorded on each one, also the date of sale and value received right from the inception of the Appraisement Board, I am satisfied that everything possible is being done, both for the grower and the interests of Australia.

I carried home with me two samples, one of Greek fruit valued and sold at 52s. cwt. and one of Australian River fruit appraised at 28s. and sold at 27s. cwt. The latter is very poor and rain damaged, and certainly no credit to us. The method of arriving at the value of fruit is systematic. The appraisement counter is of half-circular formation, and is directly under a set of large windows. It has also an electric daylight globe directly over it. This is for emergency use when the daylight fails, as it often does in London. The fruit is set out in samples of 2lbs. Each grade is kept to its own compartment. Then samples of Greek fruit are compared with them and comparisons are made and value arrived at, which is competitive to the Greek prices. If there is a glut or drop in the market and Greek fruit drops in price, the adjustment is immediately made on the Australian fruit.

I am satisfied the appraiser knows his job, and gives no preference. The position is that our currants have much room for improvement against our competitors, and we would be well advised to force a lot of the inferior and rain-damaged fruit into distillation, rather than create a bad impression by placing this class of fruit on the London market. Our sultanas are recognised in London as the best on the market, and this keeps the demand steady. The weight of opinion in London is all in favour of the Appraisement Board. The various agents think that the board is doing a good job, and tends to keep prices even. The merchants favour an open market and the highest bidder to be the buyer. The glut that Greece is able to put on the market, if she so desires, is hard to hold; yet against this our sales of sultanas have definitely increased, whereas the Greek sales have slightly lost. I rather think that this is due to the superior quality of our sultanas.

Anyhow, let us try and keep up this standard of quality, and work for improvement in our currants. Some of our leading men in London consider that some sort of umpire is necessary to keep sales even and to keep the various agents from cutting each others throats for the commission, at the expense of the grower. If this is right, then the Board claims that it acts as the umpire.

On 26th October, I had the privilege of another meeting with those responsible for the good handling of our fruit, and the impressions gathered are that currants are not as popular as they might be with the consumers, and so are neglected. At present sultanas have the preference, and sales are improving. Whether this is entirely the choice for the fruit, or whether the sample of currants offering is the drawback, I am not sure. The currant market at present is very dull, and does not show any chance of improving for some time.

Before leaving I had a final chat with the manager of one of the leading Brokers, and his idea was that on a firm market the Board does good work and keeps the market steady but he was of the opinion that on a weak or falling market, it does not allow him to act quickly enough to catch a bid when offered. However, he had a fairly open mind and spoke well of the appraiser.

To obtain a good dry sample of good colour and bloom it is necessary to—(1) cultivate well; (2) prune well; and (3) super judiciously. The first ploughing should be finished not later than the first week in September, if weather permits. This should be ploughed to a depth of 4½ to 5in. after the super has been applied. The method of applying the super varies, and I do not think it matters very much so long as enough is put on. On heavy ground we find a mixture of 25 per cent. of potash, 25 per cent. sulphate of ammonia, 25 per cent. of ordinary bone manure and the balance made up of crushed super rock makes a good serviceable dressing applied at the rate of 3cwt. to the acre. This may appear expensive, as the mixture works out at about £9 per ton, but we find it effective and profitable. After the first ploughing the disc cultivator should be applied. This chops up the soil and makes it ready for the second ploughing. It does not require to be deep; about 3½in. is a satisfactory depth. On heavy soil we start our second ploughing almost as soon as the discing has been finished, to get it worked up before the hot weather sets in. After the second ploughing the more one works and cultivates, the more moisture is retained, which is essential to obtain a good sample. In the last few years pruning has improved, and the interest shown in this direction is a great asset to our industry and relieves the grower of quite a lot of work and worry.

Tobacco Culture at Blewitt Springs

[R. GUTHRIE, Blewitt Springs (McLaren Flat Conference).]

Tobacco has been cultivated in Australia for about a century and in South Australia for about 40 years; but it was not until 1920 that the production of bright tobacco was first atempted, with an area of 1 acre. To-day in South Australia we have under cultivation 300 acres—In the Adelaide Hills district 150 acres. Next season it is proposed to double that area. The total consumption of tobacco throughout the Commonwealth is 15 million pounds, of which we produce one-third, so it can be seen there is ample room for the expansion of the industry. Providing the right type of leaf is produced, there is a ready market, and prices obtained over a period of years have averaged from 6d. up to 3s. 6d. per lb. The average yield of cured leaf per acre is 800lb. Over a period of four years, the average price obtained throughout Australia was 1s. 4½d. per lb.: for South Australia over the same period, 1s. 11½d. Working on an average of 2s. per lb. a crop of say, 800lbs. of cured leaf per acre nets the grower £80 per acre.

An Exacting Crop.

Tobacco is an exacting crop from such diverse points of view as climate, suitable soil, manures, cultivation, harvesting, curing and marketing, and a good product is possible only by meeting the requirements of the plant in all respects.

The most suitable soil for bright tobacco culture is a fine-textured, greyish-coloured sand or sandy loam, fairly deep and naturally well drained, with a friable sandy clay subsoil. Typical soils are found in patches throughout the Adelaide hills. It is generally recognised that the more humus a soil contains the more suitable it is for bright flue-cured tobacco of good quality, provided there is an adequate rainfall. Soils with too high a proportion of silt and clay do not produce good smoking tobacco. Analysis shows that 1,000lbs. of cured leaf removes 80lbs. of Potash, 60lbs. Nitrogen, 40lbs. of lime, and 16lbs. of Phosphoric acid from the soil. In using light sandy soils, it will be seen that most of the elements must be supplied artificially.

The first ploughing should be done in the autumn and as deeply as possible, with the second ploughing about 4in. The soil should be cultivated repeatedly and harrowed until brought to a fine state of tilth. This working of the soil will insure a good stand of plants and will reduce subequent labour of cultivation. July seems to be the most suitable time to put in the first seed-bed; sow one every week from then on.

Preparing the Seedbeds.

It is most essential to have a good supply of strong healthy seedlings. It is far better to have 20,000 too many than 10,000 too few. When laying out the beds, consideration must be given to the fact that the seedlings must have sunshine. Beds should run east and west. Seedbeds can be made any convenient length and width. An ideal bed is as follows:—30ft. long, 5ft. 9in. wide, back board 1ft. 6in. high and the front board 9in., covered with a cheap calico, water-proofed. The soil should be well worked, raked, and levelled. Seed can be either mixed with wood ashes and shaken over the seedbed through a flour sifter or can be sown through the water-can; either method is efficient. The seed should then be lightly pressed into the soil and the bed covered until germination takes place. From then on let the seedlings have all the sun possible, covering only at night and on cold windy days. For the prevention of Blue Mould, when the seedling leaves are as big as one's little finger nail, start to use the Benzol treatment. Beds must be made airtight, and Benzol containers placed in the beds at night. This method has been found 100 per cent. efficient in the prevention of Blue Mould. When the seedlings are 4in. to 5in. high, they are ready to be transplanted.

Land that has been under clover should be ploughed and left to lie fallow for 12 months. A crop of barley could be sown to be ploughed in. Barley, being a gross feeder, will absorb some of the excess nitrogen left by the clover, which is most unsuitable for the production of bright leaf; and again leaf with too high a nitrogen content is hard to cure. Only 45 per cent. super should be used on such land; up to 10cwts. can be used to advantage and superphosphate tends to brighten tobacco leaf. New ground should receive 6cwts. of special tobacco mixture, 3-8-3, containing the principal elements namely potash, nitrogen, and superphosphate. Manures are best broadcast before the last ploughing.

Transplanting.

In this district, October is the ideal month to commence planting out seedlings, but much will depend, of course, on frosts and the state of the ground. Soil which dries out quickly is best planted first. Seedlings planted on wet ground later invariably catch up to those planted sooner, and that is what all must aim for—a uniform stand of plants. It is a good plan to roll the ground and cross mark with a marker. I use one with four pegs 3ft. apart, so that the planter just has to put a plant in at every intersection. Care must be taken not to damage the root system when planting. Only pull sufficient plants for the day's planting, and be sure to keep them in a cool place.

As soon as the rows of plants can be seen, get the cultivator going. Set it for 2in. and cultivate to that depth until the plants are about 18in. high; then cultivate about 1in. deep, until it is not possible to get through the rows.

The field should be cultivated once a week. Plants should be hand hoed as well, care being taken not to damage the roots or leaves. Tobacco thrives on a loose soil; one good cultivating is as good as a shower of rain. From the time the seedlings are transplanted, cutworms will no doubt be busy. They can be eradicated by the use of the bran and Paris green poison bait. A good method is to nail a thin stick about 2ft. long to a 5lb. jam tin, punch one hole, about a half inch, in the bottom of the tin, start in two rows and shake the tin over each plant. Quite a considerable area can be covered without the fatigue of too much back bending.

Topping.

Like other plants, tobacco comes to flower, which must be removed, as the food and moisture the flower would use if left on the plant is wanted by the leaves. Topping, as this operation is termed, is only commenced when the majority of plants have flowered, and as this job demands a certain amount of skill, it should only be tackled under the guidance of one with previous experience. No fixed guide can be given as to the number of leaves to leave on a plant; it depends on the plant itself, season, &c. Shortly after topping, suckers or lateral shoots will appear; these must be picked out, otherwise they too develop flowers at the expense of the leaves.

Harvesting the Crop.

We now come to the last operation in the field—the harvesting of the crop—and the most important. More leaf has been spoiled and—more important—more money lost through wrong and haphazard picking than through any other cause. New growers should on no account start to pick leaf unless someone with previous experience is with them. Usually the bottom leaves commence to ripen four weeks after topping. This is indicated in leaf grown on sandy soils by a change in colour from green to a yellowish pea-green, and in the case of heavier soils or soils with an excess of nitrogen the leaves become mottled with yellow spots. On no account must the two kinds of leaf be picked at the same time, or trouble will occur during the curing. The aim of the picker must be a uniform coloured leaf. It is desirable that the leaf be removed to the sheds before becoming scorched by the sun. If possible the leaf should be picked, strung on sticks, and hung in the barn on the one day. A standard barn 12ft. x 12ft. x 20ft. will handle a crop from 5 acres. The method of construction depends entirely on the pocket of the grower. But whatever the material used or the design, I would strongly advise the ridge type ventilators.

Curing.

The curing of the leaf in not a difficult operation, although it is not just merely the drying of the leaf. Certain chemical changes take place, brought about by natural fermenting agents called enzymes. These ferments are only active while the leaf is moist, hence the need for low temperatures in the early stages of curing. It is at this period that the grower will see if the leaf has been picked to a uniform ripeness. If half the barn is ripe leaf and the other half-ripe, one or the other must suffer. In waiting for the half-ripe leaf to colour, the ripe leaf, having coloured will tend to darken. So again I impress on new growers to pick only dead ripe fruit. There are three stages of curing, namely, yellowing the leaf, fixing the colour, and drying the leaf. As no fixed formula can be given as regards temperatures, time, &c., each barn must be dealt with by the curer himself. The Tobacco Instructor will be only too pleased to assist at this period. On the completion of curing, the leaf is removed from the sticks and bulked, where a slight ferment takes place, improving the quality and richness of colour. Before bulking it is advisable to rough grade the light leaf from the dark. It will save time during the grading of the leaf, which operation takes place on the completion of curing the crop. Make as many grades as you can and do the job thoroughly—it pays. In conclusion let me stress this point: tobacco is not a catch crop, it must be tended from the time it is planted.

Dehydration of Fruit

[H. C. Platts, McLaren Flat (McLaren Flat Conference).]

The satisfactory drying of prunes requires not only the reduction of their moisture content to an amount which prevents spoiling by moulding, or fermentation, but also certain modifications in colour and flavour which have become trade standards. The skin should be black, the flesh a light amber, and should have a sweet, prune flavour free from caramelization or sourness.

Proper dehydration not only gives rapid and continuous evaporation of the excess water, but absolutely prevents deterioration in quality through mould and fermentation, and as all the drying takes place in a closed building by currents of hot air free from dust, it prevents the fruit from being contaminated by dirt or insects. Dehydration ensures a clean, thoroughly dried product, fully retaining the quality of the original fruit, and answers the modern demand for sanitary production of foods.

It has long been known that if, as a result of unfavourable weather conditions, prunes undergo a partial fermentation during sun drying, the yield of dry fruit is materially reduced. This is easily understood, as the sugar is fermented by the yeasts and a chemical action takes place which turns the sugar into alcohol and carbon-dioxide gas. As both of these compounds are volatile, they are lost in the air, thereby causing a loss in weight which is in proportion to the extent of fermentation. In dehydration the temperatures used are above the temperatures at which the fermentation organisms act, consequently such losses are prevented by dehydration.

Air performs two very important functions in a dehydrator. First, it conducts the heat from the firebox and flues to the fruit which is to be dried, and second, it absorbs and removes the water vapour which that heat has evaporated from the fruit. Therefore it can be seen that the temperature of the air in the dehydrator is not the only important factor, but more particularly the volume of heated air which passes over the prunes. As a matter of interest, at a temperature of 165°F. and and a relative humidity of 25 per cent., it requires approximately 2,700cub. ft. of air per minute for every pound of water to be evaporated.

Humidity.

The moisture-holding capacity of air approximately doubles for every 27 per cent. rise in temperature, so that it can be seen that the higher the temperature used the less time will the fruit take to dry; though the temperature should not exceed 160-165° with a humidity of not more than 25 per cent.

The methods of harvesting, dipping and traying prunes are primarily the same, whether the prunes are to be sun-dried or dehydrated.

Dipping.

Lye-dipping is not as essential in dehydration as in sun-drying, although it is desirable to allow the moisture to evaporate more readily. The amount of caustic soda to be used cannot be standardised. The following factors come in—type or fruit, temperature of day, temperature of fruit when picked, temperature of dip, sugar content and strength of caustic used. My experience is that the amount of caustic will vary from day to day and from year to year, and the only way of finding out is to test the sample of fruit. Over-dipping should be avoided.

Grading.

For efficient working of a dehydrator, it is absolutely necessary to grade the green fruit before drying, the different sizes being placed on different trucks. It ensures more even drying and increases the capacity of the machine.

Traying.

Trays should be uniformly covered. I use a machine which I made, and which takes two men to handle. It is used as a dipper and discharges the fruit on the tray so that no spreading is needed.

Temperature.

There are four ways by which dehydrators may be operated with respect to temperature.

1. *Counter-current.*—That is, the air moves in the opposite direction to the movement of fruit. The fruit enters at the cool end and is moved intermittently to the other end for finishing at the maximum temperature.
2. *Parallel current.*—The air moves in the same direction to the movement of the fruit. The fruit enters at the highest temperature and finishes at the lowest.
3. *Combination system.*—The air enters at the centre of the machine and travels both ways. The fruit enters one end at the lowest temerature, passes through the highest temperature while still partially dried, and finishes at the other end at a medium temperature.
4. *Constant temperature.*—In this the fruit is subject to a constant temperature throughout the drying period.

The counter-current system is most commonly used.

Critical temperature.—The temperature used in drying prunes is usually 160° but higher temperatures can be used if great care is taken in removing the fruit directly it is dry. The actual temperature of the prunes that are freely giving off moisture is lower than that of the surounding temperature. Lower temperatures than 160° decrease the capacity and increases the cost of drying.

Humidity.—The humidity of the air in a dehydrator is of the utmose importance. Too high a humidity decreases the capacity and may injure the quality of the prune. Too low a humidity will cause case-hardening of the skin of the fruit and retard drying, although the case-hardening is only a temporary condition which disappears after sweating.

The maximum rate of drying is attained by using the highest temperature which will not injure the fruit, and sufficient humidity to minimise the retarded drying caused by case-hardening. The humidity at the cool end of the dehydrator should not exceed 65 per cent., and at the hot end the relative humidity should not exceed 25 per cent.

Drying time.—The drying time varies according to the variety of fruit and size, but usually the time is from 24 to 30 hours.

Storage.—There is no way, at present, of determining the moisture of dried prunes other than by experience. When fruit is first taken out of the dehydrator it appears more moist than it really is, because of the softening effect of the heat. It should not be possible to roll the stone freely about under the skin. The stone should be firmly held in the flesh. Prunes should not be binned with a moisture content of over 20 per cent.

Sweating.—No matter how carefully a dehydrator be operated, there will always be a certain amount of unevenness in moisture content. Therefore it is necessary for the prunes to be stored in sweat boxes to undergo equalisation of moisture. The prune should be thoroughly cooled and each tray examined for poor quality or under-dried fruit, which should be removed before the remaining prunes are put into sweats.

Dehydration of Grapes.

From my experience, so far, I find that grapes do not dehydrate satisfactorily. After a little more experimenting the trouble may be overcome. So far I have found that currants lose their bloom, which will not return even after 12 months sweating.

By increasing the volume of air, which also means increasing the temperature, a solution may be found. Grapes contain a higher percentage of water than prunes—nearly twice the amount.

Papers Read at Branch Meetings

Woolly Aphis.

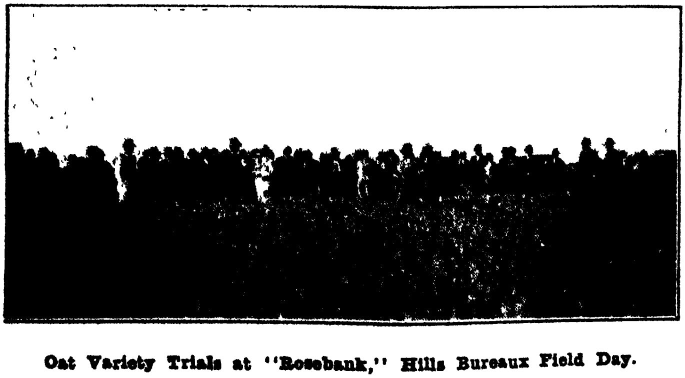
[A. T. Dodridge (Keyneton).]

Woolly Aphis is not only most damaging to the tree but is one of most difficult pests to get rid of, for two reasons. Firstly, it is not a feeder by eating the leaves, or the fruit, but gets its living by sucking the sap from the bark of the tree. Therefore, one cannot poison them, as with Codling Moth. The second trouble is that this aphis not only attacks the tree, but it attacks the roots as well, which makes it all the more difficult to destroy. If these pests are not checked they will in time destroy the tree outright. As one cannot poison the aphis, to destroy it it is necessary to smother them; and as they breathe through the body, a contact spray must be used. There are several good sprays used for this purpose, including Red spraying oil. This oil will not only destroy the aphis and its eggs, but it invigorates the tree and promotes growth as well. Being of an oily nature it does not wash off as easily as most sprays and therefore protects the tree for a longer period. Red Oil is really a dormant spray, and can be used from July until about the middle of September on apple trees, at a strength of 1 to 30, or 40, that is one gallon of oil to 30 or 40 gallons of rain water. In using Red Oil it is important to see that it is thoroughly mixed, or one may burn the trees. Try the following method:—Purchase a box of Sunlight soap. Cut this up and boil it in a 12 or 14 gallon copper until it is all dissolved. When about to spray, heat this up again ready for your mixing; then take a kerosene bucket, put in a bottle of the oil and add about half a gallon of the hot soapy water. Then take the handle of your bucket and give the oil a good twirling round for a few minutes. This will make it look like milk, and one is then sure that the oil is thoroughly emulsified. Before putting the oil into the spray tub be careful to see that there is no bluestone or lime about it, as these two sprays will not mix. Then partly fill the tub with rain water and pour in each lot of oil as you mix it. This method may take a little longer, but Red Oil is very dense, and if one were to just pour a gallon of oil into the tub and fill with water, it would be found that the stroke of the pump is too slow and does not agitate it enough to make it mix properly, and at the end of each tub one may find a lot of free oil still left, which may damage the trees. To deal with aphis on the roots of the tree, the only remedy is to dig in some dry sulphur or slaked lime around the butts of the trees after you have done your ploughing and harrowing. This will help to drive them up into the tree where one can better deal with them. One other remedy which is well worth a trial is in the form of a little parasite, which scientists have discovered during recent years. This parasite is an enemy to the Woolly Aphis and gets its living by feeding on them. On writing to the manager of the Government Experiment Orchard at Blackwood he will send some of these parasites for trial, the only charge being 6d. to cover postage. Some twigs of the apple tree with the aphis on them will be sent in a cardboard box. Place these twigs in a tin of wet sand to keep them fresh for a day or two, and hang the tin in the tree so that some of the leaves come in contact with them. In hot weather they become very active and they should soon rid us of some of the Woolly Aphis. I tried these parasites about 3 years ago and find that it has certainly made a lot of difference to the trees.

The Clydesdale Horse.

[W. Barrie (Coonalpyn).]

Like all the British breeds of livestock, the Clydesdale horse is the result of the successful mating of animals selected from other breeds and mated with the native stock of the home land. The Valley of the Clyde was noted as far back as the early part of the 17th Century for the quality of



Oat Variety Trials at "Rosebank," Hills Bureaux Field Day.

its heavy horses, which originated from the early type of war-horse. Flemish blood, through one stallion, was said to have been introduced into that district about 1650, but this is not quite certain. It may be noted here that the origin of the Clydesdale is practically identical with that of the Shire, which was built up of almost the same elements. Nevertheless the two breeds are vastly different in type to-day, due to the fact that breeders of each have had a different ideal in mind, a factor which has more influence in moulding the character of a breed than any blood lines upon which the foundation has been laid.

Mr. W. J. Spafford (Director of Agriculture) addressing Bureau members on "Beef Cattle," Hills Bureaux Field Day.

Coming nearer to present day times, while some credit must be given to such horses as "Darnley" and "Prince of Wales" on account of the marked influence they have had in moulding the modern type, it must not be overlooked that there must have been some excellent types existing prior to their period, otherwise it is hardly possible for any sire to make such a vast change in a breed in the space of a few generations. The horse that undoubtedly did the most notable work in fixing the Clydesdale type was one called "Sir Everard" the horse who sired the famous "Baron's Pride," who had such a wonderful career as a breeder, eclipsed only by his son, "Baron Buchlyvie," whose influence on present day stock is remarkable. This horse was sold at public auction in 1911 for £9,500 and stood for public service at a fee of 200 guineas per mare.

There are many differences of opinion as to what colour a Clydesdale should be. My own preference is for bay or brown with white markings. Chestnuts always have been looked upon with disfavour among the big breeders, as it is an indication of throwback to some foreign strain. The head of a Clydesdale should be well shaped and of fair size in proportion to the rest of the body, with a broad jaw and broad forehead. The eye should be large and prominent, indicating intelligence and docility. A horse with a sunken eye should always be avoided. The nostrils should be wide and open; the neck of good length, well arched over the shoulders, which in turn should be deep and well sloped back. This is an important feature of the breed, as the shoulders of the Clydesdale are more oblique than any other breed known. Wide chests were looked upon at one time as the correct conformation of a draught horse, but experience has proved that horses built that way have a paddling action and when pulling are not giving proper support to the body. Hence, while looking for a wide-chested horse, avoid one that is too wide.

The body should be deep, the ribs well sprung and close together. The rump should be well rounded and not cut away or "goose-rumped", and the tail well set on. The hock is one of the most important joints of any horse. It is upon this region that the muscles are concentrated when the horse is in action, and when in the act of rearing all the weight of the body presses on the hock. For this reason sound hocks in a stallion are most essential. The hock should be deep and flat and well supported by a good, wide, flat cannon bone. The hoof should be of good size, wide and open; narrow hoof heads lead to unsoundness.

such as ring-bone and side-bone. The knees should be broad, and the cannon bones should drop perpendicularly to the pasterns. The hair should be straight and soft to the touch, this quality of hair being found on the flat cannon bone but never on the round bone. For soundness, good feet and legs the Clydesdale holds pride of place, and to this is attributed the recognition that sloping pasterns are indispensable. Short upright pasterns always get worse with age and feeding and its action in time becomes impeded. Bitumen roads and city streets are very trying on horses, but the horse possessing the sloping pasterns and wide, open feet can walk in the city drawing a heavy load with comparative ease. The number of horses affected with feet and leg troubles is very considerable, and those bad conditions are to be laid down to the fact that breeders have not made a proper effort to improve the feet and legs of the horse. Too many stallions brought into use are faulty in these respects and we should studiously guard against them.

Pride in the Farm Work.

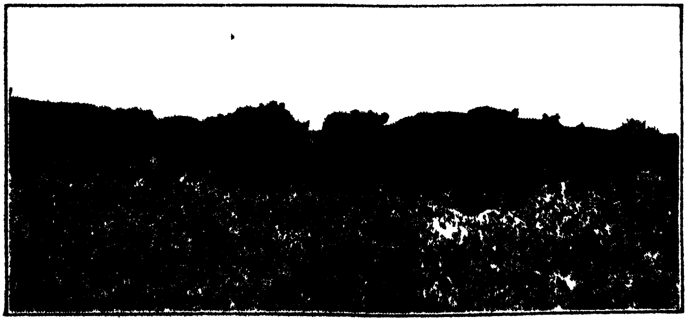
[A. BAKER (Baroota).]

A farmer should take an interest and pride in all workings on a farm. The harness should be kept in a good cool place and looked over in spare time. Rub a drop of good neatsfoot oil into harness on a warm day, and keep it out of dirt until the leather has become supple. Groom them now and then when they are losing their old coats and trim their tails to allow them time to lengthen before the beginning of summer. If worked in stony or hilly country horses should be shod (for the harvest especially).

INTEREST IN THE WORKING OF THE LAND.

When fallowing, cultivating, or harrowing have the implement following the horses as straight as possible, and have the team working at an even pace and it will be found much easier to keep in furrow. With implements doing good work and horses also working well together a farmer should leave his paddock in a creditable order. When seeding one should see that the drill is sowing evenly and not leaving a thick patch here and there. If any wheat is spilt clean up as much as possible for fowls, and scatter the rest about with hands or boots. Nothing looks worse than patches of bunched wheat in a paddock of wheat. If one desires to sow different varieties of wheat, sow in separate pieces, not a width of one variety here and another strip somewhere else. See that the drill is cleaned out before changing from one variety to the other.

When hay-cutting see that the binder is tying correctly, as loose sheaves are bad to build with or handle. It takes a good binder and a good man to make excellent work in a thin and patchy crop. When stooking, put every sheaf in its place and the stooks in rows. If done properly this will prevent a lot of damage from wind and rain. The hay yard should look spacious with a nicely built stack or two. All straw sheds should be recoated this year while we have surplus straw, and there is room for a stack or two in the corner somewhere.



Aberdeen-Angus Cattle on Mr. R. T Melrose's property, "Rosebank," Mount Pleasant.

Production of Clean Milk.

[V. Gurr (Lobethal).]

Since cow's milk is such an exceedingly important item in our present system of living and since the true value of the milk hinges so largely upon its cleanliness, it is highly important that the essentials of clean milk production be understood by milk producers.

The cows should be healthy and in good physical condition, also fairly clean to permit milking without the heavy contamination so often seen following that process. Healthy, sound udders are most essential. A cow with Mammitis will put the bacteria count of milk up to half a million or over. A cow's udder and teats must be thoroughly washed before starting to milk.

The ordinary drinking places, such as dams, waterholes, and creeks found on so many dairy farms, are sources of contamination. The cows wade in to drink, then defile the water, until soon the whole is a fertile medium for the growth of many forms of slime and bacteria. The slimy stuff dries on the cows and is rubbed off at milking time. In dairy pastures such drinking places should be fenced and provided with a tank or trough out of which water may be got without its becoming polluted.

Milkers have been shown to be another fruitful source of contamination, where care is not exercised in keeping the hands very clean during milking. Milking should be done with dry hands; wet handed milking is a filthy habit and entirely unnecessary. If the milker happens to be a mechanical one, and if the milk tubes or teat cups have not been thoroughly cleansed after each milking, the milk is contaminated at once and even in a worse way than from the agency of the soiled hands.

Milking stools made of wood or metal and so simply constructed that they may be readily washed are of some aid in the production of the highest class milk. Naturally some of the effects of hand washing and udder cleaning will be lost if the milker is compelled to seize a dirty stool just before starting to milk. Although this is a minor item, nevertheless it is one of the points to be observed.

The buckets used are another factor. The ordinary open-top bucket seems to have been designed to catch all the dirt possible. A bucket 12 inches in diameter will have about 113 square inches of dirt catching surface, whereas one with half the opening will have only a quarter as much exposed area. The construction of the bucket within is quite as important as the closing of a part of the top. All seams should have been flushed full with solder, making it possible to clean them. Every unsoldered seam furnishes lodgment for dirt, which means food and home for bacteria.

The sterilization of buckets and utensils used about the dairy is most essential in the production of clean milk which is to have good keeping qualities. In order to sterilize, boiling water or, if possible, steam is necessary, preferably the latter.

Strainers are at best a crude attempt to undo something which should not have been necessary. Strainers as ordinarily made cause the hairs, chaff, and other coarse dirt to be washed thoroughly as each successive bucket is poured over them. The best sort of strainer is one consisting of a layer of absorbent cotton between two sheets of cheese cloth.

A clean milking shed is a material aid in the production of clean milk. If the shed is not clean it is impossible for the milker to do his work in a cleanly manner. Concrete or brick floors and good drainage are most essential.

Flies are filthy things at best. They breed in the manure and carry portions of it on their bodies wherever they go. A fly swimming in the milk or lying in the strainer soon becomes washed fairly cleanly. The germs which it was more or less covered become dissolved free from the dirt and are distributed throughout the entire mass of milk. Flies may be prevented around cowsheds and country homes to some extent by the removal to the field of cowyard manure and other waste every 4 or 5 days. This may be impracticable under many circumstances, but the knowledge of the facts should lead to efforts in that direction.

Quick, thorough cooling is the second most important single item in the production of milk. Keeping out the dirt is of first importance. Cold water tanks of some form are necessary on practically all milk producing farms. The ideal tank would be one made of concrete placed low in the milk shed, thus obviating the necessity of lifting the cans high. It may be possible to pump the water through this tank for the stock, thus giving a fresh supply of clean water all the time.

Some essentials for producing clean milk are:—

The physical condition of cows.
Drinking water.
Cleanness of the milker.
Utensils and sheds in proper order.
Cooling the milk.

Farmers' Day, Kybybolite.—Stacking Grass Hay.

Tandem v. Abreast Teams.

Mr. G. M. Grocke, in a paper read at a meeting of Kyancutta Branch, said that he had worked both teams and had found that the tandem team was the easier to handle. Teams of from 8 to 14 horses were best suited to tandem, while teams of 8 or less were best worked abreast. A set of equalisers was best for the horse in the long run; when working a tandem set the horses did not work sideways. In working an abreast team the 2 horses on each side were walking sideways, which did not give the horses a fair chance. In a tandem team the horses were walking straight ahead of the implement. They could give more strength by pulling straight than could horses which were pulling sideways. A horse which had to walk sideways had to strain to keep in that position. Every horse in a tandem team had to pull the same as the horse behind, whereas a horse in an abreast team could sometimes loaf without being noticed.

A tandem team could cover more country in a month than an abreast team, because the horses in the latter relied on one another too much, and therefore they became very slow. Each horse in a tandem team had to do the same amount as the leaders. Not one farmer had a team in which every horse had the same stride or the same pace—there were fast and slow horses. Such a team put too much work on the horse that was working hard. By working as a tandem team all the fast horses could be put in the lead with the slow ones behind them. One could always push on the latter by throwing stones at them without interfering with the leaders. In an abreast team, if one tried to make a horse do his best, one would interfere with the faster horses alongside him. A point in favour of the abreast team was that one horse could be taken out of the team if it became unfit for use, while with a tandem it would be necessary to take out 2 horses, unless a spare horse was available. Horses in tandem very seldom trod on each other's hooves. In an abreast team the horses trod on one another when turning corners; that was why abreast teams were always anxious to turn in a hurry.

Tandem Sets.—Equalising chains should be used in preference to equalising swings; the swings were not as reliable as the chains. If swings came back only 3 inches, the horses in front and behind had to take all the pull. Such a state of affairs might go on for a long time before being noticed.

Discussion.—Mr. R. J. Holman said that the equaliser had revolutionised the tandem team, and it was unanimously agreed that any team over 8 horses was best worked tandem. It was agreed that straighter draught, better control and better turning resulted with a tandem team. Also the arrangement of the swings permitted the tandem team to walk straight, whereas in an abreast team the horses had to walk at an angle.

Pigs.

[L. & K. Bagshaw (Saddleworth).]

In this district, where dairying is carried on to some extent, pigs are a necessary and highly profitable side-line, but it is essential to breed and keep the right type. For modern requirements the baconer should not be too fat; the public will not eat fat, and this reduces the price per pound. Shoulders should be fine with plenty of depth of side for bacon, and with well-rounded hams right down to the hocks. Housewives, being the main purchasers, will not tolerate streaky bacon. This is caused by incorrect feeding, such as too much soft foods, *e.g.*, scraps and slops. Good corn-fed pigs produce firm, lean bacon, which is so much in demand at the present time.

No pure bred in itself produces exactly the right type, and so it is essential to cross. In crossing, pure bred boars and sows true to their own particular type must be used, as they will produce an even type; whereas if boars and sows of an inferior type are used, the progeny will be all shapes and sizes, and no straight lines of pigs will be obtained. For the local trade in suckers and porkers the Tamworth boar and Berkshire sow cross is to be preferred. These produce a long, low, quick-maturing animal. This statement is borne out by the class of animal in demand at our local markets, and the price obtainable for this particular cross is well above any other. For the baconer, a Large White boar should be used, as these produce a long-bodied pig with a wonderful side of lean bacon. The Large White cross is not suitable for porkers; they are much too leggy and do not fill out properly until the baconer stage is reached. Another important factor about the Large White is that when slaughtered the carcass is absolutely white and very attractive. This is an essential factor so far as the export market goes, but it is not so important for the local market.

We have proved that it definitely does not pay to let suckers and porkers run out and graze. We have tried both grazing suckers and feeding them in styes, and have proved that the latter is far more profitable and efficient. When a litter is grazing, the suckers run all their condition off, become leggy and take far longer to reach a certain stage than the sty-fed pigs. By sty-fed pigs is meant pigs kept in a sty, say 10 feet by 16 feet, cleaned out regularly, with batten or wood floor for

Booleroo Centre-Wepowie Bureaux.—Inspection of Roseworthy Agricultural College Wheat Plots at Wepowie.

sleeping quarters. These pigs were given exactly the same foods and both lots were given milk regularly, and the sty-fed pigs were definitely superior to those that were grazing.

When breeding, sows should be in good store condition and not fat. A fat sow will not have as many in the litter as a leaner sow, and also a fat sow is much more clumsy and is liable to lie on the litter when farrowing. Sows should be allowed to run out in a paddock until about a week or 10 days before farrowing, and should then be shut in a special farrowing pen. This pen should be kept very clean, with a board floor (not cement, as it is too cold) and with a rail, say 8 inches high and 8 inches away from the wall, running around it. This prevents the sow from lying on her litter. When the sows are brought in from the paddock for farrowing, they should not be overfed. Too much food is more harmful than not enough. The sow should always be made to clean up her last meal before any more is given her.

A big mistake among breeders of the present day is the using of immature stock to get a quick return. In doing this one greatly shortens the life and breeding capacity of the stock. No boars should be used until they are at least 12 months old. They will work before that age, but if used they will not develop, and it greatly shortens their term of usefulness. Sows should never be mated until they are 13 months old. Recent experiments in Denmark have proved that sows mated after 13 months old will have on an average two pigs per litter more than those mated younger, and it is certainly more economical to the breeder to wait until that age than to mate younger and have inferior litters.

A farmer may produce the right type, but if he does not market them at the right age and size much of his good work goes for nothing. When marketing pigs, they should not be over-fat and should be a suitable size and weight for the trade, *e.g.*, pigs should be marketed either as porkers or as baconers, and not in between the two. as there is not the same demand for them. Pigs should be marketed in a good, clean, healthy condition. A clean pig looks attractive and will bring shillings more than a dirty pig, even though the weight be the same.

In this district, pigs are an essential side-line, and there is practically an unlimited market for the right type of export pig. Farmers should take the good seasons with the bad, *i.e.*, farmers should keep an even number of breeding sows throughout a period of years. Do not sell out when pigs are cheap and buy sows when pigs are dear, but keep on producing and selling at an even rate.

Bureau Exhibit at Millicent Show.

This year the Women's and Men's Branches of the Agricultural Bureau at Millicent staged an Exhibit at the local Agricultural Show. The Branches were allotted 12 feet of space, the timber for shelves being given by Mr. Oberlander. On the wall above the shelves were displayed woollen, rag and Afghan rugs, a hide of kangaroo tanned and dressed by Mr. A. Bryant, a beautiful crochet traycloth worked by Mrs. J. Allan; woollen cosies, socks by the yard, machine done by Mr. L. Hutchesson, and beautifully hand-knitted socks by Miss D. Towers, fancy hand bags and novelties in local wood. The highest shelf consisted of vegetables and grain from the members of the Men's Branch, and they also had sample tins of grasses. Grain was in sheaves in the green stage; the sample of potatoes was worthy of praise.

The Women's Branch had a wonderful display which was suitably arranged to attract attention, and included:—Preserves, jams, sauces, pickles, chutneys, Christmas mince meat, meat paste, lemon butter, suet, dripping, breadcrumbs, beetroot bottled, butter, home-made bread, scones, soap, eggs, parsley, mint, dressed fowl, many kinds of cakes and biscuits, home-made sweets, milk, cream, distilled water, vinegar, &c. (Hon. Secretary, Lillian Redman.)

JETTING SHEEP.—The paper on "Jetting Sheep," which appeared on page 392 (November issue) was read by Mr. P. H. Grieger, of Cambrai. The name appeared incorrectly as P. H. Kreuger.

Activities of Women's Branches

WAROOWIE.

Recipes and samples of biscuits were exhibited by each member at the May meeting. Mr. C. A. Goddard, of the School of Mines, gave a lantern lecture on 8th June, and the Annual Social was held on 7th July, half of the proceeds being given to the Hawker Hospital. The Director of Agriculture (Mr. W. J. Spafford) spoke on his tour abroad on the 17th, and Miss H. Telfer gave a First Aid demonstration at the meeting held on 3rd August. A special meeting was called for 24th August. The Adelaide Congress was discussed and Mrs. Avery showed members how to make artificial flowering gum blossoms. (Secretary, Mrs. A. Crossman.)

WARRAMBOO.

Mrs. Kone read a paper, "Baking Day," at the May meeting, and Miss May Sampson was elected Secretary on 25th June. On 23rd July a Sultana Cake Competition attracted 13 entries, first prize being won by Mrs. Steer. Miss C. Chilman read a paper "Dressmaking." Recipes for making marmalade were given by Mrs. Chilman at the August meeting, and the Social and Sweets Competition was held on 17th September, the successful exhibitors being the Misses Sampson.

WASLEYS.

"Radiant Health" was the subject of an address by Miss L. Magor at the May meeting, and on 1st July, Messrs. Gooden and Newton, of Clarkson Ltd., spoke on "Interior Decoration." Sister Harris, of Hamley Bridge, addressed the meeting held on 5th August. (Secretary, Miss K. Harding.)

WILKAWATT.

Recipes for biscuits and cakes were given by Mrs. A. Young at the May meeting which was held at her residence on 18th May. On 15th June Mrs. E. Brooker read a paper, "The Uses of Lemons." One hundred and fifty people attended the Annual Social on 18th August. The Congress reports were given at the homestead meeting held at Mrs. F. Koch's residence on 21st September. Members met at Mrs. Crouch's homestead for the October meeting. (Secretary, Mrs. G. Oram.)

WILMINGTON.

Twenty-five members and 10 visitors attended the June meeting. Mrs. Bury won the Coffee Cake Competition. With an average attendance of 42, the Branch completed a very successful year's work at the Annual Meeting on July 8th. Representatives of the Singer Sewing Machine Co. addressed the August meeting. One hundred and fifty entries were received for the Annual Exhibition of Women's Handicrafts held on 7th October. Mrs. Schmidt, of Gladstone, performed the opening ceremony. Branch trophies were won by Mrs. Brown (Flowers), Mrs. Pengilly (Cooking), and the Secretary, Mrs. Cole (Fancywork).

WILLOWIE.

Officers were elected at the Annual Meetings held on the 12th July and on 31st August members visited the Morchard Branch. On 8th September Mr. Lange, of Appila, gave an illustrated address, "The North of Australia." (Secretary, Mrs. E. Foulis.)

YANDIAH.

Dr. R. Last, of Booleroo Centre, addressed members on "What Science is doing in Preventing Contagious Diseases," on 25th June. Each member brought a gift for the District Hospital. At the May meeting, Mrs. Keller read a paper "Cut Flowers," and Mrs. F. Jettner spoke on "Lime." Officers were elected on 3rd August, and, at the September meeting Mrs. A. Keller discussed a trip to the Wimmera District of Victoria. (Secretary, Miss V. Keller.)

Preserving Fruit and Vegetables.

The Library of the Department of Agriculture acknowledges the receipt of an excellent Bulletin (No. 21), "Domestic Preservation of Fruit and Vegetables," published by the Ministry of Agriculture, 10. Whitehall Place, London, S.W.1.

The Bulletin consists of 89 pages, is well illustrated; and contains chapters dealing with Bottling, Canning, Jam Recipes, Jelly Making, Fruit Syrups, Marmalade, Candied Fruits, Preservation of Vegetables, Fruit Drying, and Chutneys and Pickles. The price of the Bulletin is advertised at 1s. net.

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A. P. BLESING, *Minister of Agriculture*

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Agricultural Bureau Conferences, 1938

Lower North, at Lyndoch, 24th February (W. Georg, Rosedale, and J. S. Hammat, Williamstown).

Yorke Peninsula, at Port Victoria, 2nd March (G. H. Bittner, South Kilkerran).

Mid-North, at Narridy, 10th March (J. Klinger, Crystal Brook).

South-East (Lower), at Robe, 13th April (F. H. Banks, Robe).

Each Conference will commence at 10.30 a.m. Papers and questions for the agenda of any Conference should be submitted about a fortnight before the date on which it will be held.

Agricultural Shows

We have been advised by Secretaries of Agricultural Show Societies that their shows will be held on the following dates:—

Mundalla, Wednesday, 9th March, 1938.

Mount Pleasant, Thursday, 17th March, 1938.

Overseas Wheat Quotations

By courtesy of the New South Wales Marketing Bureau, the South Australian Department of Agriculture is supplied regularly with statements showing overseas quotations for wheat to the nearest eighth of a penny. The accompanying table gives weekly quotations in London, the State or country of origin of the wheat, and months of shipment or delivery.

Date of Quotation.	London Values.								
	S. Aus. Wheat.	W. Aus. Wheat.	Manitoba No. 3 Wheat, ex Atlantic Ports.	Argentine Wheat.	Karachi Choice White Wheat.	American Hard Winter Wheat.	White North Pacific Wheat.	Russian.	
1937.	Afloat. *s. d.*	Jan. *s. d.*	Dec.-Jan. *s. d.*	Jan.-Feb. *s. d.*	*s. d.*	Dec. *s. d.*	Dec. *s. d.*	Dec.-Jan. *s. d.*	
Dec. 16..	4 10⅛	4 7⅞	5 10¾	5 3⅞	—	5 1⅛	4 3¾	4 4½	Australian (all ports), 4s. 7½d New South Wales—(Afloat), 4s. 7½d. Victorian (afloat) 4s. 8¾d.
Dec. 23..	4 7½	4 6¾	5 9¼	5 2¾	—	Jan. 4 10⅞	4 4⅞	—	Australian (March, all ports), 4s. 6⅞.
Dec. 30..	4 7⅛	4 6⅝	5 9¾	5 3⅛	—	4 10¾	4 4⅛	—	Victoria—3,000 tons afloat, 4s. 6d.
1938. Jan. 6..	Jan.-Feb. 4 7⅞	4 7½	Jan. 5 10⅞	5 5⅛	—	5 0¼	Jan. 4 6	—	Victoria—150 tons (Jan.-Feb.), 4s. 9d.
Jan. 13..	4 9⅝	4 8¼	5 10⅛	5 5⅛	—	5 3	4 7⅛	—	—

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Progressive Centennial Development of the Pastoral and Agricultural Industries of South Australia, 1836—1936

[By Arthur J. Perkins, O.B.E., Life Member of the Advisory Board of Agriculture and of the Agricultural Bureau, Chairman of the Governing Council of the Roseworthy Agricultural College, sometime Director of Agriculture (1914-1936), Principal Roseworthy Agricultural College (1904-1914), &c.]

(*Continued from page* 434.)

THE FIRST DECADE, 1836-1846.

CHAPTER X.

The tenth and eleventh Special Surveys—McLaren's expedition to Port Lincoln—Mid-ocean conference with Flaxman on the return journey—The two find themselves forestalled by an Adelaide Syndicate, which had claimed a Special Survey at Port Lincoln without prior inspection of the locality—McLaren having failed to oust the Syndicate from the position it had taken up applied for a Special Survey immediately adjoining that of the Adelaide Syndicate—McLaren eventually realised the unsuitability of his choice, and obtained permission from the Governor to exchange sites on the mainland—The news caused consternation among London shareholders—Difficulties of G. F. Angas who had sold to English buyers the greater portion of his share in the Port Lincoln Survey—Running notes on the early days of the development of Port Lincoln and its neighbourhood.

Around the tenth and eleventh Special Surveys—both located in the immediate neighbourhood of Port Lincoln, and claimed on the 27th February and the 2nd March, 1839, respectively—there gradually unfolded a little comedy in which the chief performers were David McLaren, Charles Flaxman, and an Adelaide Syndicate—the latter in the persons of Charles Smith and Captain Henry Hawson, its accredited representatives—with Governor Gawler discreetly in the background as Master of the Revels—a comedy doubtless entertaining enough to onlookers, but not without poignancy for some of the entertainers. It all arose from the fatal attraction of that magnificent harbour at the southern apex of what we had come to know as Eyre's Peninsula, but which in 1839 Governor Gawler had named "Eyria" (¹), and the extravagant dreams of early commercial greatness that had been spun around it. As to the apparent agricultural value of the greater portion of the immediately adjacent lands, there could have been but few illusions in the minds of the few who were competent to judge. John Morphett—himself, it was true, already enmeshed in the rival but equally deceptive spell of the River Murray and its southern reaches—told the inquiring McLaren with refreshing frankness "that a Special Survey at Port Lincoln would be the extreme of folly, because of the wretched character of the land. (²) But the majority brushed such croakings contemptuously aside, in the firm belief that whatever its quality, the land surrounding the great city that must inevitably spread from the thickly thronged wharves and quays of their dreams, would as a matter of course acquire that fictitious value which happy propinquity alone could confer: and among those devout believers were for the time being—early in 1839—the usually level-headed David McLaren and the enigmatic Charles Flaxman.

Entrance of Port Lincoln, taken from behind Memory Cove, 1802.
[*Plate* 63.] (*From Westall's Illustrations of Captain Matthew Flinders' Voyage.*)

After the rude awakening caused by Dutton's unexpected seizure of the supposedly "prize" Special Survey of the Province, McLaren had taken in rapid succession three Special Surveys for the South Australian Company, aggregating eventually about 16,000 acres. This exploit had taken place towards the end of January, 1839, and he then paused to consider whether the next Survey should be claimed at Port Lincoln, or on the River Murray: or whether a Survey should be claimed at each locality, notwithstanding their remoteness

(¹) See Appendix XIV.—Proposed names for some of the major divisions of the Province.

(²) David McLaren to Edmund J. Wheeler, 9th April, 1839.

from Adelaide, and the existing difficulties of reaching these localities. The Murray could not be reached otherwise than by a laborious overland journey, or one including both sea and land journeys: and it was probably McLaren's distaste for the latter which eventually led to his first taking the schooner *Victoria* for Port Lincoln. "In the event of the Colony progressing" wrote McLaren "and there is no reason to suppose it will not do—Port Lincoln is likely to be a port of the very first importance, and to have the command of the whole of the western portion of the Colony, both for imports and exports. Instead of establishing a settlement there however, I should rest contented with having secured it—if decidedly advantageous so to do—and should most probably contemplate setting off a considerable number of the acres so as to form the site of a town, thus re-imbursing the Company for the original outlay, . . . and ultimately retaining in our hands a highly valuable property which would "have 'cost' us nothing."(³)

Something for nothing! Excellent business maxim, no doubt, for a Land Company; but fatal to the progress and development of a city or a Province; unworthy of a body professing high-sounding public-spirited principles; and amply justifying Henry George's as yet unborn theory of the iniquity of the unearned increment, except as the common or taxable property of the body of citizens that had created it. After some hesitation, McLaren convinced himself that it was his duty, as Manager of the South Australian Company, to make a personal tour of inspection of Port Lincoln and its immediate surroundings: and also that for such a purpose "it would be not only advisable but necessary to take Colonel Light with" (⁴) him. But unfortunately important engagements of his own or of Colonel Light's conspired to retain McLaren on the mainland: and then to his dismay whispers reached him to the effect that "some other parties" were "thinking of examining Port Lincoln."(⁴) He had already been forestalled at Mount Barker: was history to repeat itself at Port Lincoln? In his desperation he even toyed with the idea of claiming a Special Survey in that locality without prior inspection, by "giving as vague a description as would be received by the Commissioner previously to personally visiting it, securing thus first choice in case of any other party being seriously intending to locate thereon."(⁴) On being consulted on the subject Colonel Light "thought at first that" it might be done "and in that case that the head of the Bight or Bay would be the site for the future town: but, from general accounts given by him and Mr. Morphett and the great improbability of any other party declaring without personal inspection—for which purpose no party had left"—McLaren concluded that the risk should not be taken, to which view Light also assented: but McLaren definitely resolved that, whether Light could accompany him or not, he would go to Port Lincoln "per *Victoria* on its return from Kingscote."(⁴)

On the 18th February, he learnt that Charles Flaxman had chartered the brig *Nereus* for a month during the course of which he proposed visiting Port Lincoln, and the neighbouring Bays in the company of Samuel Stephens: in effect they left from Holdfast Bay on the morning of the 21st February, and McLaren accompanied by Henry Mildred followed "aboard the *Victoria* from Port Adelaide in the afternoon of the same day."(⁵) Realising that everything must now depend upon quick decisions and speed of action, McLaren was determined not to waste more time than possibly could be avoided: accordingly, on arriving at his destination, he sailed "right up to the head of the Bay"(⁵) which he rapidly examined; passed on to Spalding's Cove; and thence to Boston Bay. He described the "land at the head of Port Lincoln Bay"

(³) David McLaren to Edmund J. Wheeler, 29th January, 1839.
(⁴) David McLaren to Edmund J. Wheeler, 9th April, 1839.
(⁵) David McLaren to Edmund J. Wheeler, 9th April, 1839.

as "one uninterrupted succession of limestone barrenness" and hence "determined to claim a Special Survey on the west side of Boston Bay, and with all possible speed proceeded to make the best of his way back to Holdfast Bay." He had the good fortune to leave Port Lincoln several hours ahead of the *Nereus*: but being the quicker sailer, or perhaps better managed, the latter vessel caught up to the *Victoria* about half-way home. This was disconcerting: nevertheless McLaren was not yet at the end of his resources. "Presuming," he wrote, "that Mr. Flaxman was thus acting (6) partly at least on behalf of Mr. G. F. Angas, and considering that it would be very awkward indeed that there should be any collision between Mr. Flaxman and myself, and much more between Mr. G. F. Angas, as an individual," on the one hand, "and the Directors and Shareholders of his Company" on the other; (7) "I requested an interview with Mr. Flaxman on board the *Victoria,* which I obtained; and as there was" at the time "some uncertainty as to which of us should be first in Adelaide; and a great probability that neither of us would be in time to do anything at all till the arrival of the other—it being then Friday afternoon—Mr. Flaxman agreed to my proposal of uniting your interests, each party *i.e.,* Flaxman for self and constituents as one and I as representing the Company as the other;" each party "to have a half-interest and bear half expenses."

Flaxman arrived in Adelaide on Saturday the 2nd March, about 11 o'clock a.m., and McLaren at about 3 o'clock in the afternoon of the same day. "You may imagine our mortification" wrote McLaren to the unsympathetic Wheeler, "on learning that during our absence, and because it became known that I had gone thither, a Company had been got up" based "upon the most vague recollections of Captain Hawson, Senior, who had" once "put into Boston Bay for cargo" and who "on the strength of it" had secured the first choice "for the Adelaide Company." The following descriptions of the boundaries "of the Special Survey were received by Mr. G. M. Stephen, and in the absence of the Governor accepted and acknowledged as sufficient"—*i.e.* "from the centre of Boston Bay 15,000 acres in any direction ! ! !" (8) The actual wording of the claim in the *Gazette* of the 2nd March, 1839, was "From the centre of Boston Bay in Port Lincoln in any direction." (9)

What had actually happened during the absence on the high seas of our speculative explorers was best shown by the following extracts taken from the *South Australian Gazette and Colonial Register.* "We hear," said that paper on the 23rd February, *i.e.,* two days after the departure of Flaxman and McLaren from Port Adelaide, "that Mr. McLaren, the Manager of the South Australian Company, has proceeded to Port Lincoln in the *Victoria* schooner, and that Mr. Flaxman has also sailed for the same place in the *Nereus,* freighted expressly to examine that fine locality. Each of these parties is understood to be in search of *sufficient harbours* for sites of Special Surveys." (10) And a few days later under the heading "*The New Settlement of Port Lincoln*": "It was no sooner known that an attempt on the part of the South Australian Company was about to be made to secure for itself this magnificent port than many colonists—especially those who were aware of its capabilities, and who desired its advantages to be participated in by the public, joined together and obtained a Special Survey of what is considered to be the only available portion of Boston Bay. This was done with so much promptitude that when the Company's Agent returned from his inspection of the place he found, as in the case of Mount Barker, that *he had been anticipated and Boston Bay is now public property.* The Company has chosen a spot to the northward, which includes the eastern harbour, sheltered by Boston Island —in every respect inferior to the station selected by the colonists." (11)

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(6) *i.e.,* Endeavouring to secure Special Surveys in the best situations in the Province.

(7) G. F. Angas was at the time Chairman of the Board of Directors of the South Australian Company.

(8) David McLaren to Edmund J. Wheeler, 9th April, 1839.

(9) *South Australian Gazette and Colonial Register,* 2nd March, 1839, page 3, col. 4.

(10) *South Australian Gazette and Colonial Register,* 23rd February, 1839, page 4, col. 2.

In the meanwhile it must not be imagined that a man of McLaren's aggressive temperament would think it consonant with his dignity meekly to accept defeat without some prior show of counter-attack upon his triumphant adversaries. And in Edward Stephens he had in Adelaide, presiding over the Company's Bank, an able lieutenant temperamentally after his own heart, ever ready to second, and if need were to anticipate his chief's well-known business tactics. Accordingly, in the present instance, Flaxman, who, as had already been stated, was the first to have reached Adelaide and the first therefore to have learnt the dismal news, must have made early contact with Edward Stephens, for they two proceeded that morning to Government House, and loudly protested against the alleged illegality of the acceptance by the Acting-Commissioner—G. M. Stephen—of a Special Survey defined so loosely and so incogruously as "15,000 acres from the centre of Boston Bay in any direction." Moreover, the protest was supplemented by a pressing request that others desirous of claiming a Special Survey in the same district, might be allowed to do so forthwith on the basis of "boundaries more in accordance with the regulations of the Commissioner"—whatever these might have happened to be. At this stage in the comedy, we might well imagine shrewd, kindly Governor Gawler reviewing in his mind with some astonishment the recent exploits of David McLaren—his attempt to oust Dutton from priority of claim at Mount Barker—his attempt to secure sole possession of the township of Glenelg—his unfortunately successful raid upon Port Adelaide—and now his determination to oust an Adelaide Syndicate (12) from Port Lincoln—surely such a one would find legal grounds for priority of claim in the Moon, should one demented have expressed a desire to secure a Special Survey thereon. Actually however, Governor Gawler appeared to agree that the definition of the boundaries of the Special Survey claimed by the Adelaide Syndicate, was unusually and unnecessarily vague: but he demurred to the suggestion that on such an account they had forfeited their claim to priority of choice in the Port Lincoln district: It appeared to him that all that was needed was that the wording of the claim should be so amended, as to enable others roughly to determine where the Syndicate's Survey began and where it ended: and accordingly, Governor Gawler called upon the members to amend their claim upon these lines not later than five o'clock of that afternoon—Saturday, 2nd March, 1839. In the subsequent interval, it was a very much dejected McLaren who turned up on the new scene of action; and subsequently reported to London that "the other party were with the Governor at least half an hour, when met for the purpose of declaring their boundaries and, instead of having even then confined them to the Regulations of the Commissioners, they described their boundaries as being 'from the centre of Boston Bay in Port Lincoln extending generally to the southward.' Nor was this all, on our inquiring if we could then secure the land to the northwards of the centre of Boston Bay, the Governor told us we could not—that the other party might go a mile or two to the northwards of the centre of the Bay, but would have this Survey generally to the southwards."(13) McLaren asserted, too, on the information of one who claimed to have been present when the Syndicate endeavoured to define the boundaries of its Special Survey, that members "were quite at a loss, knowing nothing distinctly of the matter, and that the Governor," had "helped them with that finally adopted vague definition; indeed" had "suggested it, and then had" subsequently "felt himself bound to award to them all the advantages that could be made to comport with that vagueness. Considering my communications to you confidential, I add that I am sorry to say his *absolutism* is in my opinion unchanged. (14) And then more in sorrow than in anger added: "I pass in the meantime without any comment this conduct of the Governor so different from that which I experienced as to the Mount Barker district. We declared on the 4th March for the second Survey there"—*i.e.* at Port Lincoln—"from the centre of Boston Bay extending generally to the northward and westward, &c. From the circumstances of the case, and the importance of Mr. Flaxman having it in his power to sell and grant titles, we applied to have the Survey in my name as a private individual; but the money having been paid in the name of the South Australian Company, Mr. Osmond Gilles"—the Colonial Treasurer—"refused to concur in that arrangement, availing himself of his official influence to gratify his personal spleen, spleen occasioned chiefly, I believe, because of my claiming Glenelg. (15)

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(11) *South Australian Gazette and Colonial Register,* 9th March, 1839, page 7, col. 3.

(12) The body of men who successfully secured the first Special Survey at Port Lincoln, was usually referred to in the press of the day as "The Adelaide Company," or even "The Company": but as in those days the South Australian Company which had assisted at the birth of the Province was invariably referred to as "The Company," to apply that term to another association of men could but lead to confusion and call for tedious explanations, hence my excuse for the somewhat anachronistic use of the term "Adelaide Syndicate" or "The Syndicate."

Port Lincoln, 1865. From a sketch by F. H. Babbage.

[*Plate* 64.] (*Courtesy Archives.*)

A few weeks later—between the 5th March and the 6th April, 1839—McLaren paid a second visit of exploration to Eyre's Peninsula, in the company of Samuel Stephens, who on this occasion represented Charles Flaxman: during the course of this visit McLaren had occasion to re-examine carefully the two Port Lincoln Special Surveys, and felt able to report to his London Directors that the activity of the Syndicate at Port Lincoln had not hitherto encroached upon what he had had in mind for the South Australian Company. True, the water-frontage question had not yet been finally settled: but there was little that the Syndicate had hitherto selected that he—McLaren—would have chosen; and as to the country in the interior the Syndicate knew very little about it. It was true, however, that the Syndicate Shares had already sold at a considerable advance on their face value, but there was certainly a "break down" looming ahead. Apart from one or two, none of the members of the Syndicate possessed sufficient money to develop their holdings: indeed, their chief anxiety seemed to be to sell out at a premium as soon as possible. (16) And in this

(13) David McLaren to Edmund J. Wheeler, 9th April, 1839.
(14) David McLaren to Edmund J. Wheeler, 25th January, 1840.
(15) David McLaren to Edmund J. Wheeler, 9th April, 1839.
(16) David McLaren to Edmund J. Wheeler, 9th April, 1839.

fashion did the fox find consolation in the thought that the grapes beyond his reach were undoubtedly too sour to be edible.

But the London Directors, who had easy access to the "puffing" statements of the *Register*, whose Editor—George Stevenson—was a prominent shareholder in the Syndicate, were not so easily deceived: an ample opportunity was given to the jealous London Manager to hector the unfortunate McLaren in lofty magisterial style: "The Directors," he wrote, "are most anxious to have full particulars about Port Lincoln; what land they have there, what you purpose doing with it, &c., &c. The stir making by the Proprietors of the Port Lincoln Survey No. 1, with their chuckling at having forestalled us, have excited our shareholders greatly, who are most eager for information, as to what the Company has really gained or lost, and what the Company really has. Your remark that 'their operations will not materially affect our interest' implies that we have suffered something by not getting the first Survey, and the Board are very desirous of some explanation of the cause."

"I have occasionally adverted to the matter of sparing no effort or expense to acquire the most accurate information, and the Directors cannot but regret that when you were examining Thistle Island last year"—as a prospective but ineffective whaling station—"you did not proceed on to Port Lincoln and investigate its real merits; or that when the fishery was established within a few miles of the Port no attempt was made to visit the place. Had either been done you might have had it all your own way."

"The spirit of candour also compels me to remark that if the excitement caused by our intended expedition to examine the Port"—*i.e.*, Port Lincoln—"led the attention of the other party to the matter—which the papers seem to imply—there appears to have been an absence of secrecy or caution. It is desirable not to overlook either in this age of competition. Too much prudence in maturing and executing plans seems impossible. Had the expedition gone *via* Kangaroo Island all might have gone smoothly, as the departure of our vessels for Kingscote would have been too ordinary a circumstance to attract notice; and from Kingscote it might have pursued its trip unnoticed and unknown, and returning by the same route you might have given the first intimation of the subject by contriving that the notice of your Special Survey being claimed, and your readiness to grant building leases, &c., should appear in one day." (17)

McLaren's rejoinder was justifiably peevish, but not altogether frank, in one respect at all events: "Really," he wrote, "you are very unfortunate in some of the particular details you select in which you tell me how I should do. When I went first to Port Lincoln I gave out that I was going to Kingscote: in the *South Australian Register* of the 9th March in the list of departures you will see that of the *Victoria* on the 22nd February for Kingscote. I did so in truth: I intended to have put in and taken Mr. Giles on board but we spent so much time in getting down the Gulf that I changed my plans and proceeded direct."(18) In the latter connection "candour compels us to remark"— to echo Wheeler's unctuous phraseology—that in this reply, McLaren had of set purpose or by an unbelievable oversight, omitted to point out that a *Register* of an earlier date—namely, 23rd February, 1839—had drawn attention to the fact, already noted by us that McLaren in the *Victoria*, and Flaxman in the *Nereus*, had both set out for Port Lincoln in search of "sufficient harbours for sites of Special Surveys.(19) In a small community in which everybody knew quite as much about his neighbour's business as he did of his own and sometimes more, leakage of information, so unfortunate in its ultimate results to some

(17) Edmund J. Wheeler to David McLaren, 14th October, 1839.
(18) David McLaren to Edmund J. Wheeler, 11th February, 1840.
(19) *South Australian Gazette and Colonial Register*: 23rd February, 1839, page 4, col. 2.

can hardly be attributed fairly to somebody else's moral obliquity; but with far greater likelihood to McLaren's inveterate habit of seeking information from all and sundry on matters outside his own ken, such for instance, as land matters generally; and in such circumstances "the keeping of secrets" would be quite out of the question.

But the end of Port Lincoln Surveys was not yet: the last act of the comedy had yet to be staged. In January, 1840, David McLaren wrote that the Governor had "at length come to a decision as to the boundaries" of the Adelaide Syndicate's Special Survey at Port Lincoln: and this decision, in McLaren's opinion, would render "almost valueless" the adjoining Special Survey which he had claimed for the South Australian Company and G. F. Angas. Notwithstanding the fact that the Syndicate's claim for a Special Survey had set out officially that it was to be "from the centre of Boston Bay, extending generally southwards," the Governor had allowed the survey "to extend a mile and a half to the northward of the centre," and to such an extent as to affect the Survey to a depth of four to five miles inland. "This decision," wrote McLaren, gave to the Syndicate "a valley a mile at least to the northward of the centre in which" was "a succession of water pools and which" conducted "into a good country about four to five miles from the shore," including "that part of the Bay which I was most anxious to secure." McLaren then fell back upon his favourite theme when in trouble—"the utter hopelessness of obtaining any redress in this Colony" so long as the function of Governor and the Resident Commissioner were vested in one and the same person. But the extent to which in such matters McLaren was obviously blinded by self-interest—or shall we say eaten up by zeal for the South Australian Company—was perhaps best shown by the fact that he did not realise the impropriety of describing as "monstrous" in January, 1840, Governor Gawler's decision—whilst admitting in the same breath, that after all the Governor had done no more in 1840 than he had warned McLaren in March, 1839 that he would do—and in which McLaren must be taken to have acquiesced, since, despite the warning, he did not hesitate at the time to call for a Special Survey adjoining that of the Syndicate and immediately to the north of it.(20) Much as one might dislike the smug reproofs that issued from time to time from the comforts of Wheeler's London Office, the following admonition, although relating to another matter, might well be said to have been earned by McLaren upon many an occasion. "You must be very cautious in your proceedings," wrote Wheeler, "lest you presume too much upon advantages *expected* from the Governor, for after much expense you may find your hopes disappointed. *It is quite evident that Colonel Gawler is aiming at strict impartiality, and will seldom confer exclusive advantages on the Company or anyone else.* Therefore before doing much take care to have a good understanding beforehand. You will generally make better bargains before rather than after works are done."(21)

Early in April, 1840, McLaren proceeded to Port Lincoln for the purpose of fixing exactly the boundaries of the Company's Survey in that locality: he took with him Henry Nixon and John Hill, who according to him were highly competent judges: but unfortunately, and perhaps not unexpectedly, on "the unanimous and decided advice" of the latter, McLaren felt himself driven to the painful necessity of applying to the Governor for permission to relinquish the Port Lincoln Survey and to transfer all its rights to a more favourable location on the mainland: and to this request the Governor, after careful personal examination of the land eventually agreed.(22) The official reasons given for acceding to McLaren's request were to the effect that the Survey did not contain within the outlines described a reasonable proportion of suitable land, and that the Survey had been claimed "at a period when the geography of the country was very indistinctly known."(23)

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(20) David McLaren to Edmund J. Wheeler, 25th January, 1840.

(21) Edmund Wheeler to David McLaren, 22nd June, 1840.

"I relinquish Port Lincoln with deep regret," wrote McLaren. "The Board and the shareholders must feel much disappointed:" but "I am morally certain that disappointment will lessen as time revolves, and unfolds the incapacity of the country there to support a population of any extent." . . . . "Mr. Hall, who is a better judge of land than" the Governor went over the country "and maintained that it can only be said to be fair sheep runs."(24) Again: "I give it as my decided opinion that Port Lincoln, even as to Survey No. 1, will be virtually a recurrence of what has been seen and done at Kingscote. The Harbour, in each case, is unquestionably safe, capacious and beautiful: but there is no contiguous country to support it. The population will be left for a long time very limited, wages excessive, the grog shops will take all the money, and the labouring population discontented, dissipated, dishonest. The resemblance between the two will be modified by the circumstances of there being a government establishment at Port Lincoln; and there being pasturage for sheep, and some patches of good land for agricultural purposes: but the general resemblance I am satisfied will be very apparent."(25) Again: "Bad as my opinion"—*i.e.*, of Port Lincoln—"was of late, I did not think it would have so soon, and so signally been confirmed. Captain Porter has abandoned it at last. He has removed his family to Hobart Town, and left a person at Port Lincoln, it is said, mainly to look after his property. He was the mainstay from the first, and the other settlers are without capital, enterprise, or any necessary qualifications for such a situation, and entirely composed of discordant materials."(26)

Brave, sweeping statements, no doubt, but in which the wish to some extent must have been father to the thought: but nevertheless, excusable from a man, with his back to the wall, who on his own initiative had taken the grave responsibility of a complete reversal of policy—a step calculated not only to shatter the hopes and dreams of wealth of bewildered London shareholders, including their Chairman—George Fife Angas;—but also to destroy any lingering confidence they might have had in their Adelaide Manager. It will be recalled that during the course of that celebrated Conference on the high seas, when McLaren and Flaxman studied how best to divide up between them an unknown territorial wealth of Lower Eyre's Peninsula, it was finally agreed that both assets and costs should be pooled, on the basis of, one-half to the South Australian Company, and the other half to Flaxman and his constituents, whoever the latter might at the time happen to be. In that particular instance, possibly because of the doubtful aspect of the venture, Flaxman decided to stand aside, and nominated G. F. Angas sole owner of 2,000 acres of land—*i.e.*, one-half of a Special Survey to be taken in the neighbourhood of Boston Bay—for which Angas would be obliged to pay £2,000 in London to the South Australian Company. And eventually the latter, all unwitting of what the future held in store for him and fondly imagining that at last an opportunity had presented itself, which should enable him to recover somewhat from the repeated shocks of Flaxman's doubtful tactics, unhesitatingly accepted the position and paid over to the Company the £2,000 said to be due by him: and thereafter proceeded to improve the occasion by disposing of these Boston Bay lands in England "on the plan of a secondary town"; and such was his salesmanship that in a few months he sold from 1,500 to 1,700 acres at £4 per acre, aggregating him from £6,000 to £6,800 in a very short time: unquestionably a very good bargain! Nor could we have expected him to have foreseen McLaren's unauthorised surrender of the Port Lincoln Special Survey: but in such circumstances what could be done to save the position? The purchasers, whose money Angas held, would certainly look to him for the delivery of the lands and for the realisation of the promises made by him concerning these lands: and obviously Angas must look to the company to keep the bargain made by its Australian Agent. Nor at the time had Angas particular reasons for being pleased with David McLaren; and he had even come to feel very much out of touch with his London Board of Directors. "My inclination at present," he wrote somewhat grimly, "is to keep the South Australian Company to its arrangement at Boston Bay!"(²⁷) McLaren, on the other hand who a few months later, was to meet in the flesh the Chairman of his Board of Directors, affected to make light of this aspect of the question: and from the safe distance of 12,000 miles felt able to write that the sales made by Mr. Angas of some of his portion might occasion difficulty; but he did not think that it would be insuperable. The purchasers, he presumed, would be pleased with the change when they learned the facts of the case; but, if determined to settle at Port Lincoln, he hoped arrangements could be made to effect an exchange with some parties interested in the Special Survey No. 1.(²⁸)

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(22) David McLaren to Edmund J. Wheeler, 16th April, 1840.

(23) David McLaren to Edmund J. Wheeler, 1st June, 1840.

(24) David McLaren to Edmund J. Wheeler, 16th May, 1840.

(25) David McLaren to Edmund J. Wheeler, 25th April, 1840.

(26) David McLaren to Edmund J. Wheeler, 29th June, 1840.

Anthony Forster (1813-1897), Representative of G. F. Angas.
[Plate 65.] (Courtesy Archives.)

And yet, McLaren's jealous prognostications notwithstanding, Port Lincoln founded by the original proprietors of the Adelaide Syndicate, did not fail entirely as he had anticipated, and perhaps hoped: true, like the Province as a whole, it fell ultimately upon evil days which involved settlers in financial losses and mental suffering: nevertheless many of them were able to weather the storm and the city from which so much was originally expected was able to survive. And even although to-day—some hundred years later—the original dreams have not yet been fulfilled, Port Lincoln with its 3,025 inhabitants, was the undisputed capital of the western half of the South Australian State; nor could it be doubted that with fuller and more efficient occupation of the back country it would continue its progressive rise to greatness.

Let us now take into account a few passing milestones in the early development of this important town.

(²⁷) See Appendix XV. at back of volume—George Fife Angas and the Boston Bay Land.

(²⁸) David McLaren to Edmund J. Wheeler, 8th August, 1840.

9th March, 1839.—"The only circumstance we need at present allude to as illustrating the opinion generally entertained of the suitability of Boston Bay, is the simple fact that £50 has been paid for eight acres which ten days ago were purchased for £8."(29)

16th March, 1839.—"The settlement of this important Harbour"—Port Lincoln—"proceeds with great rapidity. The *Abeona* sailed on Monday with a large party of gentlemen interested in the enterprise. The *Porter* and the *Dorset* followed during the course of the next week, both fully loaded by Mr. Porter and Mr. C. Smith. Doctor Imlay has contracted to land stock there at the same rate as at Glenelg; and not least in importance a newspaper—*The Port Lincoln Herald*—is to be published on Wednesday week"—*i.e.*, 27th March, 1839. "Vigour of this description is not to be stifled by any set of monopolists; and we are glad to say that application has been made through an influential quarter for the establishment of a branch bank of one of the Van Diemen's Land Companies."(30)

19th March, 1839.—A party deputised by the proprietors of the Special Survey at Port Lincoln arrived at Boston Bay on Tuesday . . . . last. They were accompanied by B. P. Winter, who was engaged as surveyor to lay out the proposed town, &c. . . . . The schooner *Abeona* with the gentlemen of the deputation, entered by the northern channel, and the *Porter* by the southern. After the surveyor and his party had landed, they proceeded to inspect the coast with a view of laying out the proposed town. Towards Kirton Point to the southward of the Bay, the water deepens considerably, and near the point it is deep enough to admit of vessels laying in three and a half fathoms of water, within a few yards of the shore. At this point the principal part of the town will be. About one and a half miles to the northward of the point the surveyor discovered springs of fresh water sufficiently plentiful—if no other be discovered—to supply water to the town, and shipping, there being a constant run. Just behind the beach there is a beautiful valley, named Happy Valley, containing about 200 acres of splendid black alluvial soil of which fifty acres are to be laid out as a town . . . . From all that has been discovered, there appears to be abundance of fresh water. The greatest deficiency is in timber—nothing but the she-oak having been discovered within five miles of the coast. The deficiency, however, it is hoped, will be supplied by the discovery of a party who have gone into the interior for ten days or a fortnight, and who intend to effect a complete exploration of the interior. There is an abundance of granite for building purposes, and a great plenty of limestone. The natives appear to be very timid, none of them having been met with except a woman and three children, who ran away: but on being overtaken, accepted biscuits from the party. Upon the whole the examination of the Harbour coast and land, has been most satisfactory, demonstrating the Survey Number One at Boston Bay as the most splendid by far that has been demanded in the Province. Already there are 150 inhabitants on the spot, and a party from Kangaroo Island, after surveying the coast, situation of the town, &c., came at once to Adelaide, and made purchases of land. One-half-acre section, near Kirton Point, was sold last week at Port Lincoln for £120 . . . So far from the *scheme,* as it is charitably called, proving a failure, the promoters of it are more sanguine since their visit to the Bay, than they were before, of its complete and triumphant success."(31)

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(29) *South Australian Gazette and Colonial Register,* 9th March, 1839, page 7, col. 3.

(30) *South Australian Gazette and Colonial Register,* 16th March, 1839, page 3, col. 1.

(31) *South Australian Gazette and Colonial Register,* 6th April, 1839, page 3, col 4. See also Appendix XVI.—Exploration around Port Lincoln by R. Tod.

6th April, 1839.—*Swearing-in of the first Magistrate at Port Lincoln.*—This ceremony took place at "Happy Valley" in the presence of the whole of the population, amounting at the time to about 150 souls. Captain W. F. Porter having been advised by the Governor that he had been appointed one of Her Majesty's Justices of the Peace for the Province of South Australia, he immediately caused notice to be given to the inhabitants of his intention to take the usual oaths of office and assume its duties forthwith. Accordingly a public meeting was called at "Happy Valley" over which Mr. M. Smith presided. He began by congratulating Captain Porter upon his appointment, and then congratulated the inhabitants on the rare discrimination of the Governor in selecting Captain Porter for this important position. He felt convinced that Captain Porter would administer justice with complete impartiality. Captain Porter in reply stated that it was his determination to repress to the utmost of his ability any outrage that might be committed; but to be equally open to the complaints of the poor as to those of the rich—to the complaints of the weak as to those of the strong.(82)

13th April, 1839.—"It is already determined that arrangements for the reception and accommodation of emigrants" at Port Lincoln "shall be made; and we have great pleasure in announcing that our public spirited Treasurer, Osmond Gilles, has presented an acre of his town land comprising a half-section of water-frontage for the purpose of erecting proper buildings for their comfort on arrival."(83)

Supply of Provisions at Port Lincoln and Fish Stories.—"Fresh beef and mutton are selling at 1s. 3d. per pound"—at that time the Adelaide quoted price for beef and mutton was 10d. to 1s. per pound—"and this price will be reduced to 10d. or 1s. when the cattle contracted to be delivered by Doctor Imlay arrive. It is intended also to drive a herd from the Adelaide District overland in the course of a few weeks and we have just been informed that Captain Finnis, whose practical knowledge of the matter few of our readers will dispute, will undertake to deliver stock from Sydney to Port Lincoln at the same price he would charge at Adelaide. The supply of fresh fish of all the best kinds is also abundant within the Port; and in all directions throughout the Gulf. Captain Flinders states that while at Memory Cove a seine was hauled on the beach with such success that every man of the two ships had two meals of fish and some to spare for salting." While the *Cygnet* lay in Spalding Cove in December, 1836, Captain Lipson, R.N., the Harbour Master of Port Adelaide, caught daily, in an hour or two, with a hand line, a supply of fish sufficient for the consumption of his own large family and servants; and plenty also to spare for the crew of the ship; and the gentlemen who have just arrived speak of the abundant quantity of fine schnapper, rock cod, mackerel, &c., which are obtained with the greatest ease by anyone who can procure a boat and time to catch them. This supply of cheap and wholesome food on the spot is an important consideration, affecting the price of labour and the expense of living, and one which of all others Adelaide most suffers from. Fish in that place is never to be had in the state which the *gourmand"* (*gourmet?*) "would call perfectly fresh; and then at from 6d. to 9d. per pound. In Port Lincoln it may be caught for nothing: or purchased alive from the boats at a penny per pound."(84)

17th August, 1839.—"It gives us much satisfaction to learn that Port Lincoln is about to give a decided proof of its progress in the establishment of a newspaper. The *Port Lincoln Herald,* the first number of which appeared

(82) ***South Australian Gazette and Colonial Register,*** 6th April, 1839, page 3, col. 2.
(83) ***South Australian Gazette and Colonial Register,*** 13th April, 1839, page 4, col. 2.
(84) ***South Australian Gazette and Colonial Register,*** 13th April, 1839, page 4, col 2.

some time ago in Adelaide, will be published in a few weeks at Port Lincoln, Mr. Dehane being about to remove his printing establishment from this city for the purpose."(35)

2nd October, 1839.—It was intimated that Matthew Smith had been appointed by the Governor Resident Magistrate for the new-proclaimed District of Port Lincoln; and John Erving Barnard, Clerk of the Peace and Clerk to the Magistrates at Port Lincoln.

Matthew Smith (1795-1858), First Resident Magistrate at Port Lincoln.

[*Plate* 66.]

The District of Port Lincoln above referred to was described for the purposes of the new Act(36) as embracing the whole of the mainland of this Province, lying to the west and north-west of the line of coast extending from Cape Catastrophe to the extreme head of Spencer's Gulf, and all the islands lying within twenty-five miles of the coasts of the said mainland.(37)

19th October, 1839.—"That the Colonists of South Australia understand in what the merits of Port Lincoln consist is proved by the fact that two 24-acre sections in that Survey, possessing no extraordinary advantages, were sold at Mr. Hailes' Auction on Thursday last for upwards of £160 each; one allotment—not a water-frontage—was sold for £46, and another for £31: and this, be it remembered, the day after Mr. Eyre's unfavourable report as to the quality of the land in the western division of the Province became universally known. The question—is there good agricultural land in the neighbourhood of Port Lincoln—is one of very little moment. The unequalled harbour of that district will inevitably constitute the town of Port Lincoln, the Liverpool of South Australia; and to an important maritime town, what matters it whether the corn consumed be grown within ten miles or a hundred miles? &c. . . ."(38) Port Lincoln had at all times enjoyed the advantages of an "excellent press": but in the present instance, it scarce needed to be stressed that we had there another instance of the "sour grapes" philosophy.

11th January, 1840.—"The *Recovery,* Captain Johnson, had arrived" at Port Lincoln "with 1,600 sheep, and arrivals of stock were anticipated overland both from this place and Sydney." Whilst in that vicinity Captain Johnson was guilty of the statement, so often repeated since, to the effect that "the whole of the British Navy might be moored here" in Port Lincoln Harbour "in perfect security."

"In consequence of injudicious alterations in the original Survey of the town, made by a parcel of speculators assembled round a coloured chart, we shall have one of the worst laid out towns in any British colony. Had it been left entirely to our talented Surveyor the case would have been very different."—From the *Port Lincoln Herald* of the 21st December, 1839.

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(35) *South Australian Register,* 17th August, 1839, page 5, col. 1.

(36) "An Act to establish Courts of Resident Magistrates"—No. 2 of H.M. Queen Victoria.

(37) *South Australian Gazette,* 3rd October, 1839, page 7, col. 2, and page 8, col. 1.

(38) *South Australian Register,* 19th October, 1839, page 4, column 3.

To this statement the ***Register,*** the Editor of which—George Stevenson—was one of the "parcel of speculators," took exception: "We think," it said, "blame is here laid on parties who do not deserve it. We know nothing about the talent of the Surveyor mentioned, and cannot therefore pronounce an opinion as to the probability of the case being very different had he laid out the town: but we do know this that the plan as originally proposed provided for no public access to the sea beach, and if that be the change alluded to, the 'injudicious alterations' spoken of consisted in remedying that whimsical blunder."(39)

"Since leaving England" wrote the Editor of the *Port Lincoln Herald,* "we have never seen finer vegetables in such abundance or variety as they are at present. The potatoes planted early in the season have not done so well as those put in about the latter end of August: but the late crop is very promising. Some of the finest potatoes we ever saw were on the table of the public dinner on Tuesday. There is a fine patch of turnips in Mr. Porter's garden at Boston Island as well as an abundance of vegetables of every description. Mr. Hawson's eight acres of wheat and potatoes have been partly destroyed by various wild animals, in consequence of his not having any fence, and there is, we are sorry to say, not much chance of an abundant crop. Mr. Pittington's maize looks exceedingly fine, as well as everything else growing in Happy Valley, where the soil appears to be very productive. We may mention as facts that peaches, gooseberries, and cherries have been gathered at Boston Bay only eight months subsequent to the arrival of the first settlers."(40)

11th January, 1840.—***Matthew Smith, Resident Magistrate at Port Lincoln, to Captain Charles Sturt, Assistant-Commissioner.***—"Since my arrival at this place I have endeavoured to obtain sufficient information from personal observation chiefly, and from sources on which I can confidently rely, respecting the soil and capabilities of this district, to enable me to furnish you with an authentic account of them, as requested by your letter of the 11th October last, which I had the honour to receive previously to my leaving Adelaide

In the first place the population of Port Lincoln consists of 220 souls: viz., 136 males and 84 females. There are about 80 head of horned cattle, chiefly cows, and about 2,000 sheep, with a few goats, pigs, geese, turkeys, ducks, and fowls, and 12 horses.

The trade has hitherto been confined to Adelaide, Hobart Town, and Launceston, and the articles imported principally provisions.

There are about 30 houses, either finished, or in course of completion: and nearly all built of handsome freestone, which is very plentiful, and easily worked. In this number I do not include the temporary erections of the labourers or first settlers.

Agriculture has only been tried in experimental crops, which however have yielded abundantly: sufficient to prove that the land in this part of the Province, already seen, is equal to the support of the population of the whole colony;(41) and were it not for the high rate of wages we should be independent of foreign supplies for our grain.

Horticulture, wherever tried, has been eminently successful and might be carried on to any extent; the land in the valleys and lagoons being quite equal to that of the Reed Beds, at the foot of the Torrens, and in large quantities immediately adjoining or within four miles of the town.

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(39) *South Australian Register,* 11th January, 1840, page 7, cols. 1 and 2.

(40) *South Australian Register,* 11th January, 1840, page 6, col. 3.

(41) Probably the writer referred to the Port Lincoln Colony.

Actuated by a desire to give you the most authentic information from personal observation, assisted by the experience of more practical men, I induced Mr. Harvey, Mr. Driver (a visitor), Mr. C. C. Dutton—"the ex-Sheriff"—and Captain Johnson, of the *Recovery,* to accompany me into the interior. We accordingly started on horseback from Happy Valley on Thursday, the 19th December last, at an early hour and taking a north-east direction from Boston Bay, we reached at about fifteen miles distant a beautiful valley at the foot of Mount Gawler. This is the valley described by Mr. Tod, Mr. Hawson, and others as "Smith's Valley." Continuing our course in the same direction, we passed along valleys for nearly thirty miles further without once ascending a hill. The valleys are all well watered by chains of ponds, very near to each other, and varying from 100 to 600 feet in length. These ponds are fed by numerous mountain torrents and are certainly never dry; but in the wet season form one continuous stream. The most distant of these valleys is the best watered, the ponds being nearer to each other, and the land is of superior description, if possible. We named this valley—which had not been seen before—"*Recovery Vale,*" in compliment to the first English ship, which had visited the settlement since its formation. The valleys vary from one to one and a quarter miles in width, and consist of fine black alluvial deposits: and at the time we saw them they were abundantly covered with kangaroo and other grass. The hills forming the sides of these valleys are of a gentle slope, and are covered with fine grass to their very summits. It happens that in the wet season the mountain torrents cause the stream to overflow its banks and thus to irrigate the valley; which accounts for the great luxuriance of the grass. On the banks of these streams are most splendid situations for dairy farms, and for agriculture as well as for grazing and sheep farming. The valleys terminate in extensive plains called the *Port Lincoln Downs,*(42) which extend for above thirty miles from the end of the valleys along the eastern coast, and appeared to vary from seven to fifteen miles in width from the sea. These plains are lightly timbered with she-oak, and well-adopted for sheep-walks, the grass being of a soft and fine nature in tufts and as I am informed, better adapted for sheep feed than kangaroo grass. There is a creek running through the downs, in the bed of which we discovered a few holes of excellent fresh water, amidst many of a saltish taste, for which Doctor Harvey accounted by supposing that the bottoms of most of the holes were of basalt; but you will have his own opinion in the letter which I have the honour to enclose. Fresh water may be had by digging within a very short distance of the surface. The plains are varied by slightly undulating hills, lightly timbered with she-oak and a few strips of scrub. These plains with the valleys contain at least one thousand square miles of excellent agricultural and pasture land, the whole of which is immediately available, as the downs stretch to the margin of the Gulf, and consequently goods may be easily sent from Port Lincoln by water.

There is a belt of red gum(43) (of which I send you a board as a sample) commencing at a lagoon laying about three miles west of the town, and included in the first Special Survey, which runs from thence to Coffin's Bay. Although there is no large quantity of this timber, yet there is sufficient for building purposes for several years. It does not split, but answers every purpose for which sawn timber is generally used. This I have no doubt, is the timber which has been taken for cedar by Captain Rositter, of the *Mississippi* and other parties. It can be cut into boards, four or five feet wide, and is remarkably sound at the core; the very largest trees, nearly six feet through being perfectly sound throughout. The she-oak, of which there is great abundance, makes excellent posts and rails and saws well into battens, rafters, &c.

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(42) The term "downs" is usually applied to rounded hills, or even to sand dunes, but not to plains.

(43) Mr. J. M. Black, author of "Flora of South Australia," had been good enough to supply the following note:—I think the tree referred to is *Euc. leucoxylon*, locally known as the Blue Gum. The late J. H. Maiden, the great authority on eucalypts, travelled the road from Port Lincoln to Lake Wangary in 1907, and he wrote (Trans. Roy. Soc. S.A. 32: 281):—"*E. leucoxylon* F.v.M. . . . . In the Port Lincoln district it bears the name of 'Red Gum' and attains a large size. On the western road it is not very abundant. At 11-12 miles it is common, and on the edges of the swamp—'Sinclair's Washpool' (19 miles)—are fine trees." R. T. Baker ("Hardwoods of Australia," p. 233) says:—"The wood of this tree is of a very superior class, and takes rank among the best which the State of South Australia produces."

The tract of country I had described runs to the north-east, and the good land appears to be confined to the coast. A further examination of the whole line of coast along the western side of Spencer's Gulf up to Mount Arden is in contemplation, and will be undertaken as speedily as possible. As to the Harbour of Boston Bay it is acknowledged by all nautical men who have examined it, to be one of the finest in the known world for facilities of access and security when in. Ships of any burthen may safely enter at either end of Boston Island without a pilot, and cannot be stopped, for want of water, or scarcely of wind; for when the wind does not serve for leaving at one end of the island, it rarely fails to answer at the other. The *Recovery* of 500 tons, old measurement, and carrying 1,000 tons of cargo, came in at one entrance and left at the other; with her own boat and crew she discharged about 1,700 sheep, 4 horses, and 20 tons of goods, watered at the springs in Happy Valley, took in her ballast and left the Harbour within five days.

For building purposes we have an abundant supply of freestone and granite, with lime on the spot: and besides an abundant supply of the purest water from natural springs, sufficient for the supply of any number of ships. Excellent water is got within a few feet of the surface by digging in almost any part of the town.

From these facts you will be able to appreciate the commercial and other advantages to be derived from the settlement of this side of Spencer's Gulf. Any further information which I may hereafter be able to communicate shall be forwarded to you as early as possible. I regret being unable to give you any information with regard to Ports Victoria or St. Vincent."(44) Both of the latter ports were, of course, at that time possible potential rivals to Port Lincoln.

29th February, 1840.—"We understand, that Doctor Harvey has at last succeeded in establishing a Cattle Company at Port Lincoln upon the plan of our"—*i.e.*, Adelaide's—"successful Company, in 100 shares of £20 each; and that 40 shares were taken at the preliminary meeting. We wish every success to the Company, as independently of the profits arising to the shareholders, the advantages to an infant settlement are very numerous. For instance—the supply of butter, cheese, eggs, pork, poultry—all of which come within the scope of the Company. We have no doubt but that our Port Lincoln friends in Adelaide will cordially join the above Company.

Another Company is in progress of formation at Port Lincoln in shares of £10 each—capital £2,000, to be called "The Port Lincoln Whaling Company." Seventy-five shares were taken on the day in which our information left. There is every prospect of such Company succeeding, and at a very small outlay of capital.

At the first half-yearly meeting of the shareholders in the Bank at Port Lincoln, a dividend of ten per cent. was declared, and ordered to be paid to the proprietors.(45)

All that need be said of the above matters was that at that stage the Port Lincolners seemed singularly anxious—or others were anxious on their behalf—to fritter away what little capital they were individually possessed of: whereas world experience showed, and private wisdom should have urged that the success of an infant community must depend upon the personal success of its individual

(44) *South Australian Register*, 25th January, 1840, page 5, cols. 2 and 3.
(45) *South Australian Register*, 29th February, 1840, page 4, col. 2.

members; and that such success could not be anticipated unless the small capital of it small capitalists were successfully invested in the particular business in which each such capitalist was personally interested, and not thrown away upon every grandiose scheme brought under their notice by idle schemers.

26th March, 1840.—"On Tuesday evening last George Holland, David Case, Henry Smith, and Sally, a native of Van Dieman's Land were sent to the gaol in this city, to take their trial at the ensuing Sessions for stealing two sheep from the stockyard of W. Porter. The sheep were the property of S. White: the prisoners were fully committed by Matthew Smith, Resident Magistrate of Port Lincoln. This was the first committal from the above place."(46)

19th May, 1839.—This, of course, must have been a red-letter day for Port Lincoln: a first visit to the district of Governor Gawler and his family. The inevitable festivities had of course to be faced; but apart from the latter, the Governor appeared to have made excellent use of his time by exploring the neighbourhood: and we could take it for granted that his impressions of the district would subsequently be concentrated in his reply to the toast of his health during the course of which, among other things, he said: ". . . I had of course heard of the capabilities of your district "before I arrived; but I am free to say that I came also with feelings of depression as regarded the surrounding country. My first ride was towards the Northside Hill and it did not remove them: it was the point from which Flinders" had "viewed the country, and though very commanding, yet certainly the worst from which it could be seen in reference to its pastoral and agricultural capabilities. I determined to leave the further examination of the neighbourhood of Port Lincoln until my return, and to inspect first the more northerly shores of the Gulf. I calculated that if good land existed to any considerable extent on the Peninsula, it would most probably be in the valleys at the termination of the great mountain range which Mr. Eyre met with coming from the interior from the north west. I found that termination seven miles to the westward of Flinders' 'Lagoon seen from the masthead;' and I am glad to say that the mountain slopes and intervening valleys are covered to a very considerable extent with available land, and that some low grassy tracts were seen in the interior running from the bases to the southward. The Lagoon I have named Lake Flinders, and the Port connected with it Franklin Harbour. . . . Although gratified by finding land available in the country near to Lake Flinders, yet these tracts are too far from Port Lincoln to give complete satisfaction as connected with its requirements. In returning, however, I left the coast, and examined the district called the Downs, the Valley of the Tod and the swampy flats which drain into the head of Port Lincoln proper, and which has been named Hindmarsh. After carefully considering the agricultural and pastoral capabilities of these lines of country, I am gratified to be able to offer as a decided opinion that there is in this immediate neighbourhood available land enough, at least to maintain a respectable port: how much more I cannot say, and do not for the present inquire, as the object of my visit is satisfied. I am satisfied that the government is justified in extending to it all those advantages under its control, which are necessary for the peace and well-being of a considerable society; and that I may make a favourable report of it to England.

". . . A police force came with me, and it shall be increased to a sufficient strength to prevent the annoyances, which you have experienced from persons belonging to the whaling crews in the neighbourhood, and I will take care to have your land surveyed with expedition, and sections laid out for the application of 80-acre lands orders."(47)

(46) *Southern Australian,* 26th March, 1840, page 4, col. 3.

(47) *South Australian Register,* 23rd May, 1840, page 5, col. 4, and page 6, col. 1.

Such then were the halcyon days of early settlement, when the beauty of sea and land and sky seemed to suffice; and material hardships counted but little under the steady glow of the beacon of hope: happy days soon to be engulfed in long hopeless years of unrewarded toil and carking care.

APPENDIX XIV.

PROPOSED NAMES FOR SOME OF THE MAJOR DIVISIONS OF THE PROVINCE.

Under the consideration that is due to enterprising men who first explore countries or large districts as much as possible to preserve the memory of their conduct in the name of the regions they discover, the Governor has been pleased to direct that the great coastal divisions of the Colony shall be hereafter distinguished as follows:—

First.—The territory included between the southern part of the eastern boundary of the Province, the Murray, Lake Alexandrina and the sea, to be called—"*Bonneia*" (*i.e.*, in honour of Charles Bonney).

Second.—The territory included between the Murray, Lake Alexandrina, Encounter Bay, and St. Vincent's and Spencer's Gulfs, excepting Yorke's Peninsula, to be called—"*Sturtia*" (*i.e.*, in honour of Captain Charles Sturt).

Third.—"*Yorke's Peninsula*" of course to retain the name originally given to it by its first discoverer (*i.e.*, Matthew Flinders).

Fourth.—The Peninsula included between Spencer's Gulf in its whole length and the Southern Ocean from Cape Catastrophe to the western point of Denial Bay, to be called "*Eyria*" (*i.e.*, in honour of Edward John Eyre).

In regard to the minor features of the country, to which the Natives may have given names, the Governor would take the present opportunity of requesting the assistance of the Colonists in discovering and carefully and precisely retaining these, in all possible cases as most consistent with propriety and beauty of appellation.

All information on this subject should be communicated in precise terms to the Surveyor-General, who will cause memorandums to be made of it and native names, when clearly proved to be correct, to be inserted in the public maps. (1)

ROBERT GOUGER, Colonial Secretary.

NOTE.—The names and divisions proposed by Governor Gawler had not survived, mainly perhaps because a few years later the principle of dividing the Province into Counties had been adopted; the first Counties were proclaimed on the 2nd June, 1842, namely:—Counties Adelaide, Eyre, Flinders, Gawler, Hindmarsh, Light, Russell, Stanley, and Sturt. (2) It will be noted that the "explorers" had not been overlooked, although in this instance associated with a Queen of England, two Colonial Governors and two British politicians. But there was probably another reason which contributed to the still-birth of the names proposed by Governor Gawler, a reason which his lack of sense of humour would probably have prevented him from appreciating to the full. No one can doubt the complete sincerity of Governor Gawler's intentions, but it must be admitted that such distortions of honoured names as "Bonneia, Eyria, and Sturtia," would in the mouths of scoffers lead more to their abasement than to their honour.

(1) *South Australian Gazette*, 24th October, 1839, page 2, col. 2.

(2) *South Australian Government Gazette*, 2nd June, 1842, pages 1 and 2, cols. 1 and 2.

The reference to Yorke's Peninsula may be completed by the following extract from Flinders' narrative, namely:—

"In honour of the noble Admiral, who presided at the Board of Admiralty, when I sailed from England, and had continued to the voyage that countenance and protection of which Earl Spencer had set the example, I named this new inlet, the *Gulph of St. Vincent.* To the peninsula which separates it from Spencer's Gulph, in honour of the Right Honourable Charles Philip Yorke, (³) who followed in the steps of his above-mentioned predecessors at the Admiralty." (⁴)

APPENDIX XV.

GEORGE FIFE ANGAS AND THE BOSTON BAY LANDS.

1.—A Special Survey of 4,000 acres was taken by the South Australian Company, and Charles Flaxman agreed to take one-half interest therein, the same to be paid for by G. F. Angas to the South Australian Company in London when required. The £2,000 was accordingly paid by me to them, and I proceeded to dispose of the lands on the plan of a secondary town.

2.—Mr. Flaxman had no authority from me to purchase these lands, but he agreed with David McLaren, the Company's Manager at Adelaide, that the Company should convey the whole of the 2,000 acres to me on certain conditions, which have been conformed to on my part.

3.—I have sold in England to several persons in all about 1,500 to 1,700 acres at £4 per acre, . . . and to me they look for the delivery of these lands.

4.—Now, I learn from David McLaren that he has been a second time to look at the lands constituting this Special Survey and finds them very inferior. He has proposed to the Governor who is Colonial Commissioner, to exchange them for another Special Survey nearer Adelaide; but where there is no harbour, although this is what *gives value to Boston Bay.* He has done this without my knowledge and consent; so I wait for information from Adelaide, before I can take any further measures in the affair.

5.—It is said that David McLaren consulted Mr. Rowlands, but neither Rowlands nor Flaxman have any right to give any opinion on the business, since I only possess the lands, and wait for the Survey being made to convey to each buyer his land at *Boston Bay,* and nowhere else.

6.—You can collect information on this business at Adelaide: learn what Rowlands has said and done in the affair; from whom he has derived his authority, and communicate it to me, with such additional particulars of the site chosen by the Company, as may enable me to lay the case before the buyers of the land from me. You will be very cautious not to do anything that will commit me to a change of the situation—that point I can only decide in London with the consent of all interested.

7.—Write Mr. William Smith of Port Lincoln for information. Ours was the Second Special Survey of 4,000 acres taken at Port Lincoln; the best situation and land appears to have been included in the first Special Survey. I shall have to look to the South Australian Company to put me in a right position with the persons to whom I have sold so large a part of the 2,000 acres! It is evident that at present you must not do anything with respect to this business until you again hear from me respecting it. My inclination at present is to keep the South Australian Company to its arrangement at Boston Bay. (⁵)

(³) Afterwards Lord Hardwicke.

(⁴) A voyage to Terra Australis by Mathew Flinders, Commander of the "Investigator": pages 179 and 180.

(⁵) George Fife Angas to Anthony Forester: 20th November, 1840.

APPENDIX XVI.

EXPLORATION AROUND PORT LINCOLN BY ROBERT TOD.

To
H. E., Colonel Gawler

Port Lincoln,
30th March, 1839.

. . . I left Port Adelaide on the 11th instant in the *Abeona*, Captain Hawson, chartered by the shareholders of Special Survey No. 1 for this port, and carrying Mr. Winter, the Surveyor, along with the party. Owing to light and westerly winds we did not reach the western side of the Gulf until the 16th instant, when we found ourselves about 35 miles to the north of Boston Bay. The vessel was put close inshore, and we had the view of a beautiful undulating country, bearing as much vegetation as could be expected at this season of the year; where there were valleys they appeared sufficiently green to warrant the conclusion that water would be found near the surface. The wind being now contrary, we tacked towards Yorke's Peninsula, where we next day landed at a cove in Hardwicke Bay. The lateness of the hour prevented our penetrating into the interior further than about a mile; but to this extent the soil appeared barren, and on every side a flat country: the few stunted trees we passed were the she-oak. We again put to sea, and after passing over a shoal not laid down in any chart, as will be detailed by Captain Hawson, we arrived here on the 19th instant.

Robert Tod (1798-1864), Explorer. From a sketch by S. T. Gill.
[*Plate* 67.] (*Courtesy Archives.*)

High as our expectations were raised by the enthusiastic description of preceding navigators, they were fully realised. On rounding Boston Island to the north or south, a magnificent harbour opens out, having two entrances, but the greater part nevertheless land-locked. It is a semi-circle, almost surrounded by hills, wooded to the water's edge, sufficiently high to be picturesque; but neither so high nor so steep as to form a barrier to the interior. Deep water close in shore washes a beach of gravel or stones, save on the south side, where for a short distance, it is sandy and comparatively shallow. We landed on a mountain in front of a beautiful vale which we named "Happy Valley" and hoisted the British Flag under a salute from the vessel. Unfortunately, owing to the imprudent management on the part of the gunner, one of his eyes was blown out—the other severely wounded, besides the loss of a finger. In the absence of surgical assistance, the *Abeona* was sent back with the unfortunate man, and he is now an inmate of the hospital. Under the circumstances, and understanding the individual to be a man of good character, I venture to recommend him to your Excellency's kind consideration.

On the 20th, Mr. Winter, accompanied by Messrs Fenn, Stephens, and myself, proceeded up Happy Valley, and crossed the ridge of hills separating us from the interior. We found them generally of one character—open she-oak forest, somewhat stunted in appearance, rising from a soil of from 6 to 8 inches in depth, beneath which we observe in various parts a stratum of limestone rock. Some hills were barren, and covered with granite or ironstone; but the majority even at this unfavourable season of the year, had sufficient grass for the depasturing of sheep, while the valleys might sustain a limited number of cattle, or be adapted to agricultural purposes. The scenery is splendid, and from the highest hill behind the harbour there is a charming view of the bay and surrounding coast; while towards the west, the coast and sandhills adjoining Coffin's Bay were distinctly visible. North-west lay an undulating country, clear in many places with belts of open forest, and at no great distance the bed of a lake about nine miles in circumference, having all the appearance of being filled in winter. We descended the other side of the range and calculated the distance from the harbour to the undulating country to be about three miles. We proceeded towards the lake, distant three miles further, but were prevented by the swamp from approaching the centre, where we observed the water had not been dried up. There is in winter an outlet from this lake running apparently into that arm of the harbour named by Captain Flinders, *Port Lincoln.* The bed of this river now dry, was covered by large gum trees, whose fresh appearance indicated water near the surface: in fact, we saw a pool of it near the lake, and it was *fresh.* The breadth of the bed of the river, together with marks on trees and rocks in the channel, indicate a considerable body of water issuing from the lake at certain seasons. We did not see any natives, although their tracks were occassionally visible on the paths. We returned by a route less elevated, and therefore more fit for drays reaching the coast at the south side of Boston Bay, where the land is low.

Tents and various temporary buildings had been in the meantime erected in Happy Valley, and the surveying operations now commenced by sea and land. With the exception of the sandy beach already mentioned, deep water was generally found to extend close in shore which, combined with the stillness of the sea, renders it well adapted for wharves and dockyards. Accordingly, 83½ acres have been laid out for the water-frontage of the projected town; of which a plan will be laid before your Excellency for approval. Government reserves embodying what we understand to be your Excellency's wish, have been our first care; but to prevent any mistakes on our part, the shareholders, before proceeding further, will submit their views to your Excellency's approbation. On examining the map it will be remarked that besides the above water-frontage, 366½ acres will be laid out for a town on the promontory terminated by Kirton Point, while fifty acres will be measured out for retirement in the Happy Valley 2¼ miles distant.

On the 23rd instant, a party was formed for a tour into the interior, consisting of Messrs. Austin, Crouch, Fenn, Phillipson, Stephens, Williams, and myself, two natives of the Adelaide tribe and the servants. In the absence of means of transport we found it necessary to limit our journey to four days, including the return, as we had to carry our provisions, cloaks, and munition, and under the uncertainty, a supply of water. We directed our course nearly north at the foot of the hills along the sea coast; and as we advanced, we found the land better adapted for pasturage, though still of the same general character. After traversing about six miles of open forest, we passed through three miles of barren scrub; a little farther on we came to the northern promontory of Boston Bay, which we crossed at its base. While I was examining the Bay, on the other side of this promontory, our party fell upon a river about 150 feet wide and 6 to 8 feet deep. They acquainted me that they had named it the *River Tod,* in compliment to the individual under whose direction they had placed themselves. We followed this river to the sea, but found at the entrance a bar, about three feet deep. Turning back to the west we ascended its course to a distance of about four miles and found generally deep water and the same width; but all along salt. The bed now became dry, with occasional pools, two of which were brackish. It being now sunset we formed a native break-weather'' of boughs, and passed the night in this place. Next morning we proceeded west to ascertain the source of this river; and soon came to the hills when it became evident that at certain seasons a large body of water is discharged impetuously into its channel. Although five miles from the sea in a straight line, and considerably above its level, we found in the bed of this river deep pools of salt water. After travelling about seven miles farther west, over steep hills, we discovered a rill of fresh water, at the foot of a high peak, visible from all parts of Boston Bay, and forming a good landmark to the north. While resting here we observed seven emus. We now ascended the peak, and from the summit had an extensive view from the north-north-east to the south-south-west, the northern point of Boston Island bearing south-south-east about 21 miles distant. To mark our gratitude for the manner in which your Excellency has conducted the affairs of this Province, we named the mountain *"Mount Gawler."* On looking westward we found that at this part of the chain there is a second ridge of hills immediately behind it, less elevated, but extending about 18 miles in a westerly direction. Anxious to see the country beyond, we descended Mount Gawler and proceeded west. At the bottom we discovered a beautiful vale to which I have given the name of *"Cowan Vale."* The soil here is rich, and grass luxuriant, arising perhaps from a river which during the rainy season evidently runs through it. Anxious to get as far as possible to the westward, we pushed on, and hoping to find water in some of the valleys through which we passed. We discovered none, and at sunset it became necessary to retrace our steps to Cowan Vale, where there is water. Our party arrived considerably fatigued, and rested for the night. Next morning we proceeded to survey the extent of Cowan Vale; and found it about five miles long varying in breadth for a half mile to one mile. In the centre is *"Cowan Lagoon,"* 188 yards long and 44 yards broad, apparently deep and containing excellent water. To the west of this vale the hills are extremely barren, although some of them bear stately gum trees. Provisions now fell short, and in the absence of everything on which we could subsist it was deemed necessary to return. Unwilling however, to go back without attempting pleasing relations with the natives, whose fires we observed in various directions our two friendly natives of the Adelaide tribe were sent forward in advance to a part where the number of fires seemed to indicate a little village. We followed at some distance. Shortly afterward we fell in with a native woman and two children digging roots with a stick. They were terrified at our appearance, but gradually tranquillized by presents of biscuits and perhaps still more by our immediate departure—a course advisable under our ignorance of the language in which she addressed us. Mr. Williams did not comprehend her dialect. By and by our two natives rejoined us stating they had seen at a distance two of the blacks; but that their height, aspect, and extremely long spears, had discouraged intercourse. We now returned to Cowan Vale, directing our course to the harbour; but when practicable following the course of the stream. Proceeding south by east we at length came to that part of the Bay which we had left to ascend Mount Gawler, having thus ascertained that the Tod takes its rise in Cowan Vale. This night we encamped in a little valley of the first range, about 16 miles distant from the settlement. I may observe that some of our party saw three other natives to-day; they did not seem alarmed, but on observing the others come up walked leisurely away. We likewise saw to-day three kangaroos, being the first seen by us in this quarter. Next day we arrived here at 2 p.m.

The general feature of the first range of hills for at least twenty miles north are open forest, generally she-oak, rarely gum trees, the soil is shallow, but with few exceptions, they may be considered adapted for sheep runs. The climate of Port Lincoln appears to be superior to that of St. Vincent's Gulf, being at this season much cooler, amounting frequently to cold. The sky has been generally cloudy during our stay as well as that of Mr. Flaxman, embracing a period of about seven weeks. The wind during the same period has generally been from south-east to west.

There are now three vessels in the harbour, the *Abeona, Porter,* and *Dorset*: the number of settlers about 120.

Appointed by the party in question to draw up a report of the country in the vicinity of this settlement, I believe that I have embodied their sentiments; and although it is not so favourable to the immediate vicinity as could be wished, yet, when the natural advantages of Port Lincoln are taken into consideration, enough remains to encourage enterprising settlers in locating themselves on these shores.

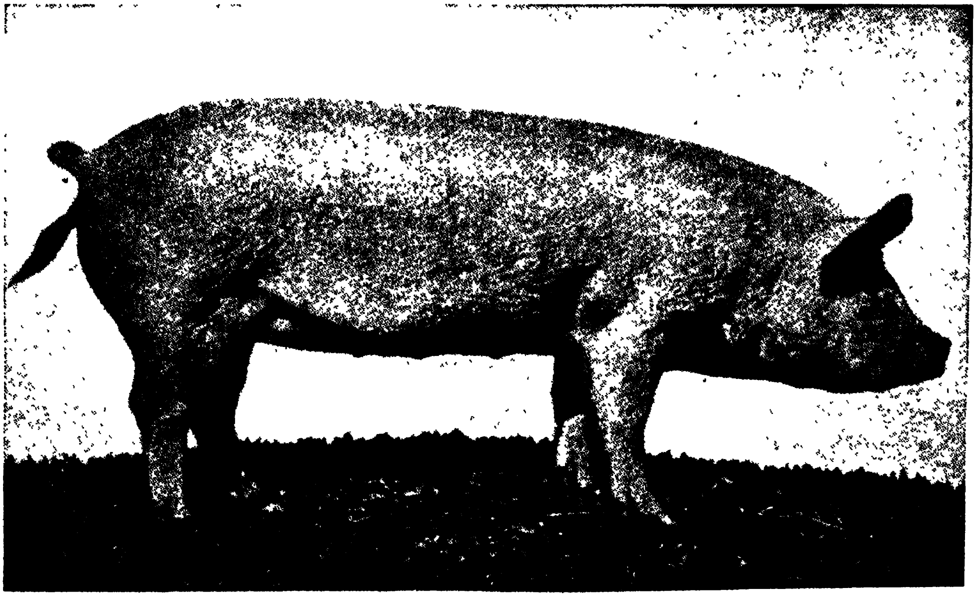
(To be continued).

Pigs for Export Overseas

Only One Type of Pig Suitable for the Export Trade to United Kingdom

[By W. J. Spafford, Director of Agriculture.]

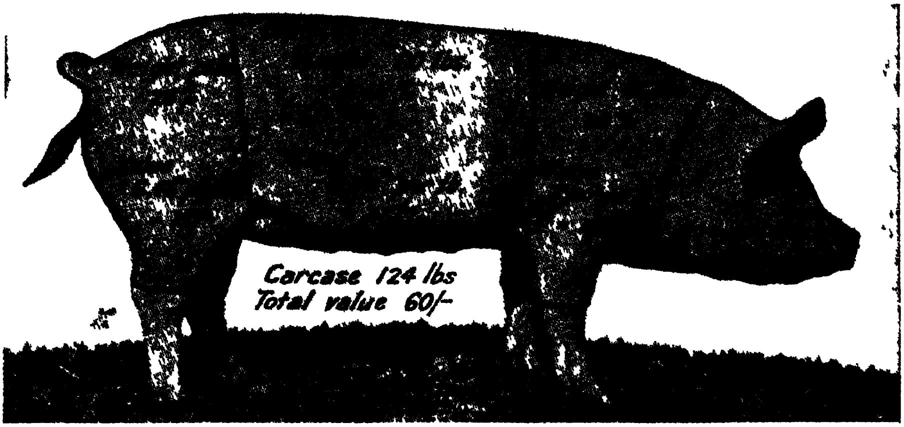
The Commonwealth Chief Veterinary Officer in London (Mr. H. R. Tinney), who keeps a watchful eye on all meat imported from Australia, considers that the possibilities of increasing the exports from Australia to the United Kingdom of baconer carcases are really bright, but he insists that producers must keep the objective of a first-grade bacon type always in mind.



Ideal pig for present-day market requirements.

The Type of Pig Required Overseas.

The type of pig which brings top market prices overseas is a long, lean, rangy animal, deep in the side, light in the head, neck and shoulders, straight on underline, slightly roach-backed, with well developed hams, and in such condition that the carcase shows not more than 1½in. of back fat. White pigs are preferred, because they predominate in the market, but provided the carcases are singed when being dressed, other colours are quite suitable, provided all of the type requirements are fulfilled.



Pigs with long, deep bodies and light forequarters have high market value.

Condition of the Animals.

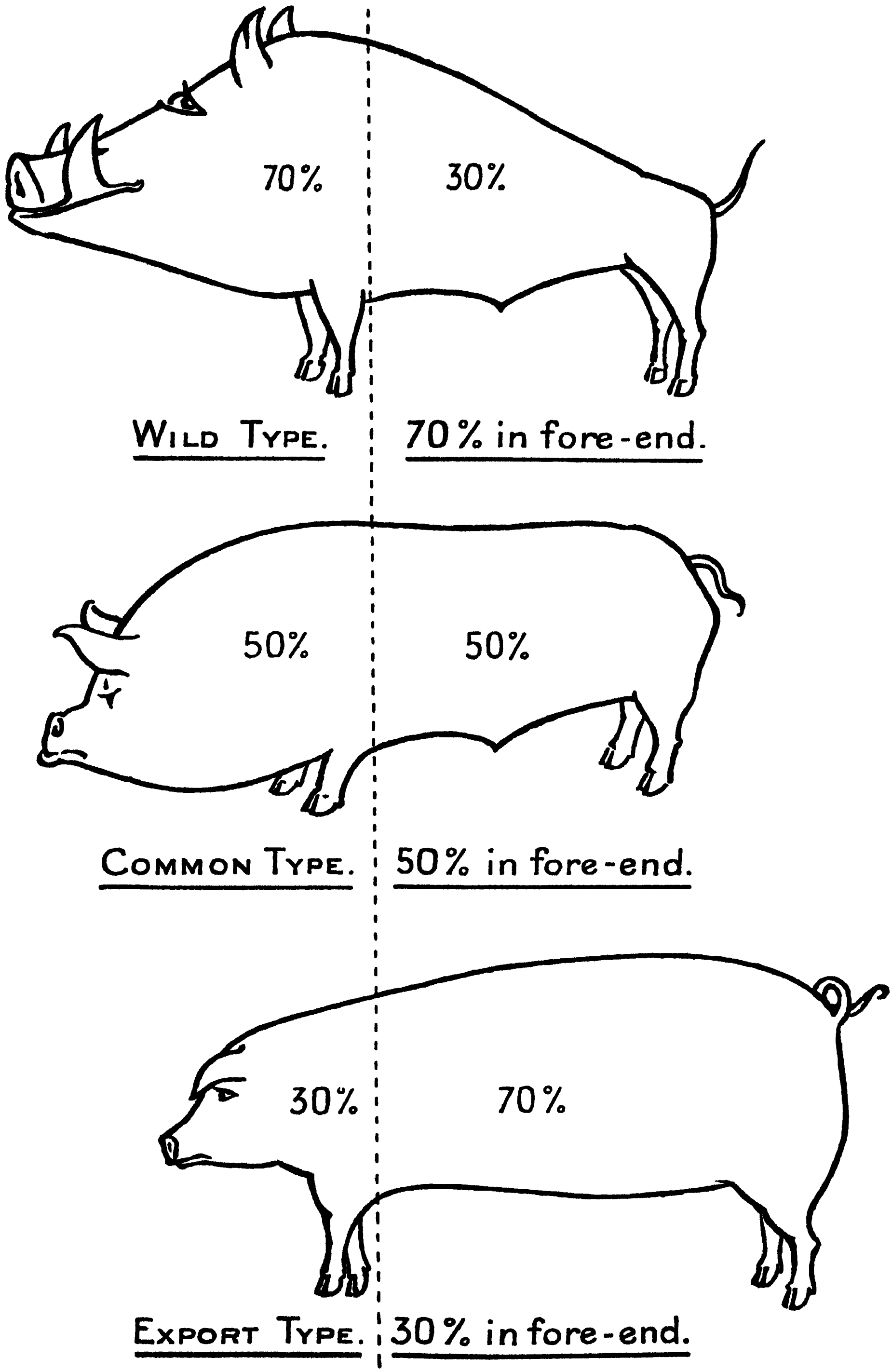
Although carcases with a high proportion of lean to fat are essential the leanness resulting from under-feeding is not the kind of condition desired. The correct condition is developed by careful feeding and is particularly helped by allowing the youngsters plenty of freedom and exercise until they are getting close to marketing weight.

Predominance of Cross breds by Large Whites.

The great bulk of pig carcases imported into the United Kingdom, for which top prices are secured, were sired by Large White boars and there is no breed so suitable as sires for this purpose, because of the high proportion of animals of correct type got by them.

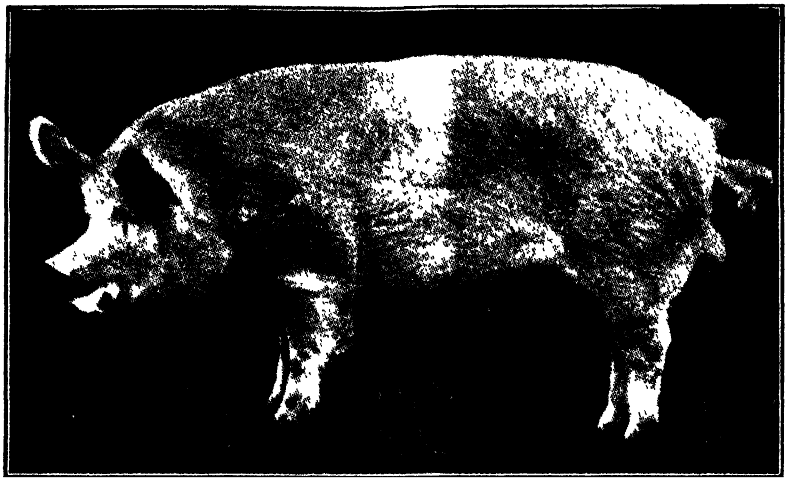
Breeding the Type in South Australia.

In South Australia the type of pig desired for export can be secured by mating Large White boars to halfbred Tamworth x Berkshire, Tamworth, Canadian Berkshire or Large White sows, and now that singeing apparatus is provided at the Metropolitan Abattoirs to help in the preparation of export pig carcases, the result of crossing Tamworth and Canadian Berkshire pigs leaves very little to be desired, provided the youngsters are allowed to grow before they begin to put on too much condition.


70%
30%
WILD TYPE.
70% in fore-end.
50%
50%
COMMON TYPE.
50% in fore-end.
30%
70%
EXPORT TYPE.
30% in fore-end.

DEVELOPMENT OF MODERN TYPE OF PIG.

PIG BREEDERS ANNUAL 1937-38



[*Pig Breeders Annual.*]

Large White Boars are the sires of most of the pigs marketed in the United Kingdom.

[*Pig Breeders Annual.*]

This Landrace Sow is the type capable of breeding the ideal present-day market pig.

Tubercle Free Herd Scheme.

The following herds have been tested and comply with the conditions laid down by the Tubercle-Free Scheme, whereby stud-owners may apply to have their herds tested, free of charge, by the Stock and Brands Department:—

Owner and Address.	Cattle. No. of	Date. Expiry
1. J. H. Dawkins, Para Wirra Jersey Stud	25	16/4/38
2. W. Hawker, Anama Friesian Stud, Central Bungaree, *via* Brinkworth	37	25/11/39
3. O. H. Woodward, Marama Jersey Stud, Gilles Plains	22	2/11/38
4. G. L. Hampton, Cloverdale Illawarra Shorthorn Stud, Echunga	25	12/8/39
5. J. M. Bray, Sweethaven Jersey Stud, Langhorne's Creek	26	19/8/39
6. Kybybolite Experimental Farm, Kybybolite	88	1/9/39
7. A. Kelly, Alexandra Jersey Stud, Milang	38	21/10/39
8. Agricultural College, Roseworthy	70	9/11/39
9. E. F. Schulz, Eden Valley	30	16/12/39

Germination of Rain-Soaked Wheat

By W. J. Spafford, Director of Agriculture.]

A good deal of speculation is being indulged in as to the possible effects of the soaking and drying of ripe wheat which occurred during the rainstorms of the week ended 4th December, 1937, and again during the week ended 11th December, 1937. Fortunately, the weather accompanying the heavy rains of the first of these two weeks was so steady that although the whole wheat plants were in a saturated condition for some days, very few of the crops lodged, and so they dried out really well. This was so much the case that in many wheat-growing districts it was possible to recommence harvesting on 10th December, but the respite was very short-lived, for further heavy rain fell on that night, thus preventing further harvesting until 14th December.

In the district of which Turretfield Seed Wheat Farm is the centre, 223.75 points of rain were recorded during the week ended 4th December, and 92.25 points during the next week, and as the relative humidity of the atmosphere was exceptionally high on the first four days of December, it was feared that a good deal of damage would be done to the wheat crops which were ripe when it rained.

To test this point, samples of grain of Ranee and Sword varieties harvested on 10th December and 14th December have been tested to show to what extent, if any, the germinating power has been affected by the wetting and standing in a saturated condition through several days of high humidity, then drying out for a day or so, and again being soaked by about an inch of rain. Before submitting the samples to the germination test the embryo ends were inspected under a microscope magnifying 40 diameters, to note visible damage, and other than severe bleaching, little was to be seen.

Variety.	Grains Possibly Sprouted. Harvested 10/12/37. Per Cent.	Harvested 14/12/37. Per Cent.
Ranee	1.3	3.9
Sword	4.2	9.8

Not a single grain showed a shoot protruding, but the damage taken as "possible sprouting" was where the skin of the embryo was burst as if by pressure from inside. The four samples were then submitted to germination test with the following results:—

Variety.	Percentage Germinated. Harvested 10/12/37. Per Cent.	Harvested 14/12/37. Per Cent.
Ranee	99	100
Sword	94	97

Besides the high germination results, there was no excessive development of moulds on the grains. The Ranee was harvested with stripper and cleaned in a Power Winnower, whilst the Sword was harvested with a brand new machine of Reaper-thresher type, and the slight loss of germinating power of this latter variety appears to be due to harvest injury, because of the newness of the machine rather than to weather damage.

Effect of Bleaching and Weathering on Wheat Grain Quality.

The Agricultural Gazette of New South Wales publishes a statement by Mr. L. S. Cayzer, M.Sc., B.Sc.Agr. (Analyst), that light or bran bleaching has no noticeable effect upon milling or baking quality. Severe bleaching, and possibly a slight degree of sprouting, bring about some important changes in milling and baking quality. In the case of hard wheats, milling quality and baking quality are both improved, the varieties Dundee and Baringa showing remarkable improvements in every instance. The milling quality of soft wheats may be slightly improved, but there is a tendency for flour yield to be decreased. There is an improvement in baking quality, but it is not nearly so marked as in the case of hard wheats. The degree of improvement depends upon the variety—Ford, for example, showing only a slight improvement or even a reduction in quality, while Nabawa shows a considerable improvement. The improvement in baking quality is due to a better degree of maturity of the flour.

Severe sprouting damages baking quality, causing poor dough handling quality and a tendency for the dough to run on the boards. The bread is inferior in crumb, colour, texture, and flavour.

Legume Establishment and its Function in Relation to the Development of some of the Poor Soils on Kangaroo Island

[By T. H. STRONG.*]

Introduction.

A large proportion of Kangaroo Island lying between the 20in. and 26in. isohyets, and comprising the Central Plateau, surrounding hills, ridges, and slopes upon which leached (podsolised) soils containing nodular ironstone occur, should prove suitable for intensive pasture development. Comparatively little has so far been brought into production, although the "heavier" soils of the mallee of the east of the island and some of those of the inland flats along the watercourses have been successfully utilised for cereal production in conjunction with animal husbandry. The leached soils, the sands and ironstone, have proved too deficient in nitrogen for cereal crops to be economically produced, and this is but one of the reasons why extensive tracts have not been successfully exploited. Economic development of these extremely poor soils is dependent upon the efficient establishment of legumes either as a crop or as the dominant element of a pasture in its early stages. Some of the difficulties which have nullified efforts in the past and which have seriously retarded pasture development, will be discussed in the light of observations made during the past two seasons.

Vegetation and Soils of Major Occurrence.

The hundreds of Cassini, Duncan, and MacGillivray have been the chief centres of observation. Leached soils are of frequent occurrence. They are notable for the fact that they contain nodular and sometimes massive ironstone. The most noticeable variations are in the depth of sand over clay and in the proportion and distribution of ironstone gravel. A characteristically friable yellow clay is a common feature, the properties of which are not fully understood, but which may prove to be of particular interest in view of the existing conflict of opinion with regard to the merits and demerits of effective ploughing, which appears to be essential in the clearing programme. (The term "ironstone" will be used to refer only to the extreme lateritic type in which a distinct horizon of concretionary ironstone is developed at or near the surface, and the related group in which the horizon is not so marked, but which usually contains varying amounts of ironstone nodules distributed throughout the surface and subsurface horizons, will be referred to as leached sands.)

The characteristic vegetation of the northward and central zones is the *Eucalyptus Baxteri-E. cosmophylla* (stringy bark-scub gum) association. (1) *E. diversifolia* (white mallee) and *E. cladocalyx* (sugar gum) are the dominant species towards the west, whilst beyond the 20in. isohyet to the east, mallee scrub is developed. The rainfall gradient is from north-west to south-east. The stringy-bark, which is dominant in the more northward areas, is replaced to a considerable extent upon the Central Plateau by the narrow leaf mallee (*E. cneorifolia*). The soils of this zone are extensively leached and contain an abundance of ironstone gravel. In parts there is a complete ironstone capping. Still further to the south-east, a typical mallee-heath association has developed. To the east and north-east, mallee exists upon grey, grey brown and red brown soils, which for the most part are higher in clay content and richer in sources of nitrogen, and which have proved excellent for cereals.

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*An Officer of the Division of Soils, Council for Scientific and Industrial Research, stationed at the Waite Institute.

The *Casuarina stricta* (dwarf oak) society, which is of universal occurrence upon the ironstone soils, is largely replaced upon deep sands by a honeysuckle society (*Banksia marginata*), and along the watercourses where pink gum (*E. fasciculosa*) occurs, by a dense undergrowth of shrubs, amongst which armed Acacia (*A. armata*) and broom bush (*Melaleuca uncinata*) are prominent. The pink gum country, though leached in character, is regarded as comparatively easy to develop, the more favourable water relationships being but one factor.

Several soil .types which are associated with watercourses, swamps, and surrounding flats where settlement has taken place, have been described. (^{2}) Areas of better class soils such as those where excellent cereal crops can be grown, are not of extensive occurrence, and can be placed in a category distinct from the poor sandy ironstone soils where cereals cannot be economically produced, and which can be developed only by means of crop or pasture legumes. The following discussion will be confined chiefly to these leached types, which are widely distributed upon Kangaroo Island.

Soil Deficiencies.

The leached sands and ironstone soils are characterised by an extremely low level of phosphate and nitrogen. The micro-organic population of the soils in their virgin condition is low, but rapidly increases following the application of superphosphate. The group of nodule-producing organisms of the genus *Rhizobium* is represented by species associated in the native legumes, few, if any, of which belong to the cross-inoculation groups of agricultural importance in winter rainfall zones. The genera *Acacia, Daviesia, Kennedya, Hardenbergia, Pultenaea,* and others are represented in the natural flora, and though the cross-inoculation relationships of the organisms associated with them have not been investigated, it is doubtful whether they will be of any importance in the establishment of medics, clovers, or peas. The specific nodule-producing organisms essential for the latter group must therefore be introduced with their seeds.

In contrast to the mallee soils of the eastern end of the island where cereal crops can be produced, and the land may be "opened up" by this means, fires playing an important part in overcoming regeneration of natural vegetation, the leached sands and ironstones do not support sufficient growth of cereals or rye-grass to carry effective fires. The programme of clearing and development must therefore be one in which the legume plays a dominant role.

Criticism of Previous Developmental Methods.

The conversion of the extremely poor leached soils covered with a stunted sclerophyllous vegetation to open pastures has been particularly slow in the past, and many efforts have been attended by failure or partial failure. However, areas limited in extent, but typical, have been slowly converted to highly productive leguminous pastures, and sufficient evidence is available to indicate that extensive areas are suitable for the growth of subterranean clover provided sufficient phosphate is applied and the plants are associated with effective nitrogen-fixing bacteria.

The reasons for failure and slowness of development in the pasture may be briefly enumerated—

1. **Insufficiency of available phosphate.**
2. **Absence of appropriate nodule-producing organisms in the soil and failure to introduce them with the seed.**

(3) Moisture limitations in freshly cleared country.
  (*a*) Depletion of subsoil reserves, during previous summer months, by natural vegetation.
  (*b*) Lack of retentivity of surface horizon.
(4) The use of mid-season or comparatively late maturing strains, the seed-setting capacity of which may not be satisfactory under many conditions of planting.
(5) The use of excessive quantities of rye-grass in initial seedings with clover.
(6) Inability effectively to combat natural vegetation chiefly through the retention of a programme of firing involving the use of non-legumes, in preference to a programme of effective ploughing in conjunction with the growing of a crop legume.

The developmental methods which have been advocated in the past have stressed the importance of "running burns" to overcome regeneration. They have failed chiefly because the nitrogen status of the soils is so low that the necessary body of rye or other grasses cannot be obtained without artificial nitrogenous fertilisers, except in limited areas, where, for example, there has previously existed a natural leguminous society such as *Acacia armata*, or where there have been local accumulations of organic matter. The use of nitrogenous fertiliser in sufficient quantities to obtain a cover of grass is economically impracticable, and even if a good burn is obtained in the first year only, regeneration will not be effectively combated. If such a programme is attempted the establishment of legumes will be delayed.

An alternative method is to fallow for a season to control regeneration and to obtain seed-bed conditions favourable for the establishment of legumes in the following season. Some of the advantages of this method will be indicated in the ensuing discussion upon the factors which must be fulfilled for the successful establishment of subterranean clover. The chief disadvantage is probably an economic one.

The most economic method of development may prove to be that in which a crop legume is used in conjunction with a cultivation programme to combat regeneration. If attention is paid to the basic principles of legume establishment, and seasonal conditions are not unduly adverse, a satisfactory crop of field peas may be grown in the first season of clearing. The relative importance of Rhizobial inoculation and several other important factors which must be considered in the development and improvement of this group of poor soils through symbiotic nitrogen fixation, will be briefly reviewed.

The Level of Phosphate in Relation to Rhizobium and the Host Legume.

The investigations at Meadows by Trumble and Donald (^{8}) have proved the value of successive heavy annual dressings of superphosphate in the establishment of subterranean clover and *Phalaris* upon a leached soil in a high rainfall zone. Apart from the requirements necessary for plant growth, the phosphate level significantly influences micro-organic activity in the soil. At Meadows, bacterial counts by the direct microscopic method were made and these were of the order of 400 million per gram of dry soil in plots receiving three successive annual dressings of 2cwts. superphosphate as compared with 38 million in those receiving none. (^{3}) Plate studies of soil samples indicated that where the Rhizobial population of the plots receiving superphosphate was particularly high, the organisms were rare in the plots receiving no phosphate. This is to be anticipated since the host plant fails to make much headway in the latter plots, but apart from the influence exerted by the host plant, the level of phosphate in the soil materially influences the spread, multiplication, and infectivity of nodule-producing organisms, a vital factor in the establishment of a subterranean clover sward. In sand culture experiments at the Waite Institute, the number of infections of clover and lucerne at eight weeks was significantly increased by higher levels of phosphate. The increases were even greater for lucerne than for subterranean clover at the same levels of phosphate.

The question of the reversion of applied phosphate to unavailable compounds in the soil is one which has attracted attention, particularly in view of the investigations of Stephens upon the red basaltic soils of Tasmania. (4) Though ironstone nodules composed largely of iron oxide are present in the leached soils of Kangaroo Island, the amounts of free reactive iron oxide in the soil may be comparatively small. Evidence has been obtained upon areas representative of soil types of major occurrence, that subterranean clover will eventually flourish, provided sufficiently heavy dressings of superphosphate are applied and effective strains of nodule-producing organisms are present. This is not proof that material quantities of phosphate are not being reverted, and the subject is worth further consideration, particularly in relation to those zones where clay is close to the surface, and where it may be brought to the surface by ploughing. The application of the superphosphate with the seed in the drill rows appears to be an important factor in first-year establishment. However, apart from the question of phosphate reversion, the explanation for the benefits of this procedure may be in the greater accessibility of phosphate supply to the young plants and the creation of comparatively high concentrations favourable for rhizobial activity and early infection in the spheres of root development. Two hundredweights of superphosphate distributed over the whole surface will not greatly increase the phosphate level of the soil to a point above the optimum for plant growth, and naturally better growth can be expected when plants have access to pockets of high concentration.

Introduction of Rhizobium with the Seed.

During the 1936 season, when an investigation of the problem of legume establishment was commenced, a very large percentage of germinated clover plants of seedlings in the new area failed to develop normally. The absence of nodules upon the roots of the stunted yellowish-red plants was noticed. This condition, though similar in appearance, is not to be confused with that which has been observed in patches of established clover upon an ironstone soil at Meadows. In this latter case, the plants had an abundance of nodules, and though nitrogen deficiency may be the cause, other possibilities have yet to be fully investigated. In the former case the facts indicated that either the essential nodule-producing organisms (*Rhizobium*) had not been introduced with the seed, or soil conditions were unfavourable for rhizobial multiplication and infection. Excellent stands were being obtained in small areas where uncleaned seed or seed in the burr was being sown. Artificial inoculation produced a significant response upon clover planted in pots of Kangaroo Island soil under glasshouse conditions, when either highly polished seed or seed rinsed in alcohol was used. Effective natural transmission of *Rhizobium* by untreated subterranean clover seed has been repeatedly observed, and a rigorous treatment of seed with disinfectants has had to be employed to eliminate this bacterium from the seed used in experiments for testing strain variation.

The habit of burying a proportion of seed clusters, characteristic of subterranean clover, and to some extent the method of harvesting the seed, are responsible under most conditions for a natural inoculation of the seed. The rate of transmission of nodule-producing organisms may not be very high, and varies according to the age of the seed and the treatment subsequent to harvesting. The practice of polishing seed by means of brushes and small quantities of linseed oil has proved responsible for lowering the natural transmission rate and in some cases nodule-producing organisms have been practically eliminated. Most of the seed planted upon Kangaroo Island in the 1936 season had been treated in this way, one of the reasons for using such clean polished samples being to avoid the introduction of lucerne flea into new areas. The high percentage failure of the clover is attributed chiefly to this fact.

Trials of Artificial Inoculation of Subterranean Clover.

Field trials of artificial seed inoculation, using tested effective rhizobial strains, were made during the 1937 season under the usual planting conditions in freshly ploughed virgin areas. The half-strip method with four replications was employed for the trials, and though at no stage of the season were there any marked differences between plots planted to treated and untreated seed observable, counts of the relative numbers of healthy plants and stunted plants with none or few nodules at flowering time, revealed differences in favour of inoculation. Highly polished seed treated with linseed oil was not obtainable for planting in control strips, the practice having been abandoned. Samples of seed containing a considerable proportion of dirt. but sold as first-grade were used, and also second-grade samples containing comparatively large quantities of soil and trash from the field of harvest. The vegetative development of a large percentage of the plants of the control plots was satisfactory, and they were infected with *Rhizobium*, though in many cases infection was somewhat delayed. Similar results were observed in all plantings made with these grades of seed planted over large areas, when heavy dressings of superphosphate were applied.

TABLE 1.—*Subterranean Clover. Comparison of Relative Percentage of Vigorous Well-nodulated Plants and Unthrifty Plants with Poor or No Nodular Development.*

Soil: Podsol.—Carrying till previous summer association of stringy bark (*E. Baxteri*) and scrub gum (*E. cosmophylla*), with oak (*Casuarina stricta*), grass tree (*Xanthorrhoea*), and variety of undershrubs.

Conditions of Planting.—Rolled in previous December, burnt in March, ploughed and sown in May; 200lbs. superphosphate drilled in with seed. Grade of seed with percentage of dust and "crumbs" of soil from field of harvest (not highly polished).

Experimental Method.—Half-strip system, 4 replications. Analysis based on counts (24 in each plot) as indicated above, made 5 months after planting date upon areas 4 sq. lks. in size, chosen at random.

Results—

"Half-strip" Pair.	Percentage Unthrifty Plants with None or Few Nodules. Inoculated.	Not Inoculated.
(i.)	15	43
(ii.)	7	16
(iii.)	18	26
(iv.)	6	30

Average number of plants per 10 sq. lks. sample = 14.

Analysis by statistical methods proves that the difference between the uninoculated (29 per cent.) and inoculated is significant. Inoculation has therefore been responsible for a reduction in the number of unthrifty plants with none or few nodules.

The percentage of healthy plants established in plots in which untreated seed was planted is high, and it was concluded that, under the conditions of planting with the particular grade of seed used, artificial inoculation is not the limiting factor in subterranean clover establishment. Provided fresh seed has not been highly polished and which contains granules of soil from the field of harvest is used, a healthy stand of subterranean clover can be obtained without inoculation. Other factors, some of which will be discussed shortly, greatly influence the rate of development of a clover sward in virgin country. The fact that a percentage of plants in inoculated plots still remains unthrifty, is noted. This season's results in general indicate that even under very rough planting conditions in soil type of wide distribution, a stand of clover plants with satisfactory vegetative development may be obtained, provided sufficient phosphate is applied and *Rhizobium* is introduced with the seed. The most economic and practical method of developing these poor soils through symbiotic nitrogen fixation will not include this stage, where a stand of healthy clover plants exists in rough country in the midst of regenerating vegetation.

It is not necessary to use the lower grades of seed for planting in new areas, and such a practice makes possible the introduction of undesirable weeds. Clean samples of seed that have not been highly polished transmit numbers of the essential nodule-producing organism, and this transmission rate can probably be increased by mixing in a few pounds of the topsoil of old clover paddocks with each bag of seed.

In contrast to subterranean clover, effective natural transmission of nodule-producing organisms (*Rhizobium*) by field pea or lucerne seed does not occur. Where these crops are being planted in new areas upon the island, artificial inoculation is practically essential, if an economic result is to be obtained. A trial of inoculation of field pea was conducted in an area and under conditions similar to those of the subterranean clover trial previously described, except that the land was re-ploughed before planting in June.

TABLE 2.—*Comparison of Yields of Inoculated and Untreated Field Peas at* 15 *Weeks.*

	Yields of Dry Matter (Oven Dry). Lbs. Per Acre. Means of 4 Replications.
Inoculated	1,980
Not inoculated	230

The differences throughout the strips were so great and so consistent that a statistical analysis to test the significance of the differences in yield is considered unnecessary. Without inoculation the crop proved a complete failure, and though a number of plants developed nodules at a late stage, the yield of peas would be practically negligible.

Less than a bushel to the acre was sown, and at 14 weeks the inoculated crop gave promise of yielding in the vicinity of 20bush. to the acre. However, during the eight weeks from flowering time only 90 points of rain in scattered showers fell, and naturally the final yield was low. The variety used was White Brunswick. However, a crop of Dunn peas sown in August in first-year country set a better crop.

The best varieties and times of planting have yet to be proved, but if a crop yielding 15 or more bushels to the acre can be produced upon this poor soil in the first year of clearing, such utilisation of the land should be advantageous, not only from the economic point of view, but also from the point of view of soil improvement, particularly if the peas are fed off *in situ*. Trials with tick-beans also have proved of interest. The avenue for development which is thus opened up is promising.

Lucerne Inoculation.

Trials of lucerne establishment with inoculated seed are in progress. Despite the fact that the climate of Kangaroo Island is so favourable for the activity of the lucerne flea, (5) this species will no doubt prove of value, particularly in the drier zones towards the east.

The Relative Importance of Factors other than the Rhizobium-Phosphate Combination.

Reliable rainfall figures for various parts are not obtainable. It is doubtful whether an average precipitation above 24in. is experienced in any of the areas at present being developed, and in most of them it may be appreciably less, particularly in the narrow-leaf mallee zones. Evaporation is comparatively low during the spring and early summer months, when average temperatures lower than those of corresponding zones of the mainland are experienced. Trumble (6) has placed the large proportion of the island lying to the west of a line drawn from near Cape Cassini to Pennington Bay in the climatic zone suitable for the persistence of the Mount Barker strain of subterranean clover, that is to say, the length of effective rainfall period is 7.5 months or greater. When a sward of this strain is finally established it will undoubtedly persist, even in the narrow-leaf mallee zones. However, the establishment of this sward is usually so slow and dependent upon unduly favourable seedbed and seasonal conditions, that it appears possible that earlier maturing strains may be advantageously used, at least in mixtures with the Mount Barker strain, particularly in the drier zones.

Factors Offsetting Rainfall Efficiency.

The efficiency of the rainfall experienced in the seasons subsequent to clearing is lowered considerably by the "droughtiness" of the soils which have been freshly cleared and ploughed. The effect of the vegetation growing during the previous season and during the early summer months is expressed in a depletion of subsoil moisture. The loose sandy surface horizons of the soil are particularly unretentive. Conditions in the loose porous seedbed of freshly cleared and ploughed land are not favourable for growth of subterranean clover during the early months of the rainfall season. Infection by nodule-producing organisms is often particularly slow under such conditions. During the spring months, when the seedbed has been compacted by the rains and consistently favourable moisture relationships are provided, the plants make considerable growth, but nevertheless, a sward will not be produced except in situations such as hollows or the lower slopes of pink gum zones, where extra moisture has been available. The late autumn development of clover appears to be vital in the production of conditions favourable for a good seed-setting in the environment under discussion. Unless the seed can be planted very early on a firm seed-bed in which favourable moisture relationships are established with the first rains, the chances of obtaining a satisfactory seeding crop are materially lowered.

Seed-setting of Mid-season Strains.

The influence of climatic factors upon the seed-setting capacity of strains varying in earliness or lateness of maturity has been discussed by Donald and Smith. (7) With regard to mid-season or late-maturing strains in zones of effective rainfall period marginal for their persistence, the micro-environment is the most influential factor in determining the extent to which flower abortion will occur during the late spring months when conditions of rising temperatures, increasing evaporation, and limited moisture supply obtain. Plants in a continuous sward will set a much higher percentage of viable seed than the isolated plants of first-year seeding. Unless abnormally favourable seasonal conditions are experienced, an effective seed-setting of the Mount

Barker strain of subterranean clover does not always occur in the early seasons after clearing, particularly in those areas where narrow-leaf mallee is a dominant species. Therefore, unless seedbed conditions are favourable for very early growth of clover, and it can be planted during the warm autumn months, the chances of effective regeneration will be small, even though the vegetative development in the first year may be satisfactory. When a sward is finally produced, the mid-season strain will persist. The fact that the Mount Barker strain has been used in practically all plantings may be one of the reasons why regeneration has often been very disappointing even where an excellent first-year stand has been obtained by planting naturally inoculated seed and applying large quantities of superphosphate. An explanation can therefore be offered for the theory developed by settlers of the island that the country must be pioneered and built up by means of quick-maturing, short-season clovers such as cluster, before subterranean clover can finally be established. The use of an earlier maturing strain of subterranean clover, used alone or in mixtures with the mid-season strain, to overcome some of the difficulties experienced in establishing a sward has yet to be fully tested. Trials would at least be worth while, particularly in the comparatively dry narrow-leaf mallee-ironstone areas, where the margin of effective rainfall necessary for the persistence of the Mount Barker strain is not wide.

Competition of Wimmera Rye-Grass.

Any factors tending to reduce the available moisture in the seed-bed will reduce the seed-setting capacity of the mid-season strain of Mount Barker under normal seasonal conditions of the island. Rye-grass is usually planted with subterranean clover, and, in past years, heavy seedings have been recommended, the object being to obtain a fire. Despite the low nitrogen status of the soils, this grass grows moderately well in the first year after clearing, particularly during the spring months when small but significant quantities of available nitrogen are liberated as the result of the decomposition of the organic residues of root and other remains of the recently cleared vegetation. During these months, when soil moisture is often low, the effects of the vigorously competitive rye-grass are so severe that the seed-setting capacity of the clover is reduced to such an extent that very little regeneration occurs in the next year. Invariably the rye-grass is allowed to seed freely and a thick stand of spindly nitrogen-deficient rye-grass plants with clover plants sparsely distributed, is what is obtained in the next year after such conditions have existed.

The Legume in Relation to the Economics of Development.

The legume must naturally play the dominant role in the development of poor soils. The method advocated for Kangaroo Island in the past, of growing grass in the early years in order to destroy regenerating shoots by means of fires is impracticable for reasons that have previously been discussed. Effective cultivations must be used to clear the country and combat regeneration. In the rainfall season following the initial ploughing, small yacca plants, seedling undershrubs and regrowth from stumps or portions of roots will appear. The most effective treatment of these will no doubt be to cultivate the land during the dry months of the following summer. Such a cultivation would no doubt prove inimical to clover regeneration in the following season, even if it had been successfully established in the first year. If, on the other hand, the land is fallowed and clover is planted in the second year, the delay before any return is forthcoming upon capital invested in clearing and cultivating is a disadvantage. However, such a practice has more to recommend it than that of planting clover under most first year conditions.

By means of artificial inoculation of the seed and the addition of superphosphate at seeding, it may prove possible to produce a crop of field peas, yielding from 10bush. to 20bush. to the acre, depending upon the season, the conditions of planting, and the variety used, upon typically poor leached soil in the first season after rolling and burning the natural vegetation. A crop legume of this nature should prove excellent for developing new land, and the following advantages are indicated:—

(1) It is readily adapted to the cultivation programme necessary to clear the land and combat regeneration.

(2) An immediate return for the capital invested in clearing and cultivating the land is forthcoming, and since it can be fed off during the summer months when feed is scarce, the number of stock carried can be materially increased. Where the land is more thoroughly cleared, a portion can be harvested as a fodder reserve.

(3) Excellent seedbed conditions for the seeding of permanent pasture will be produced. Residual phosphate and the increased nitrogen level, and greater soil retentivity produced when the crop is fed off *in situ*, will be of considerable advantage. It may prove possible to establish economically a perennial grass such as *Phalaris* at this stage, under the conditions of low competition, even if successive crops have first to be grown. This would overcome some of the later disadvantages associated with the planting of subterranean clover alone or with an annual grass such as Wimmera rye-grass.

The most suitable pasture species and strains of legumes for particular zones on Kangaroo Island have yet to be proved. Soil deficiencies other than those of nitrogen and phosphate may be associated with particular soil types. However, extensive areas of typically poor soils can be effectively developed if attention is paid to the fundamental principles of legume establishment.

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Mangels in the South-East.

A Penola subscriber to the *Journal of Agriculture* who asked for information concerning the cultivation of mangels has been advised by Mr. W. J. Spafford (Director of Agriculture) that mangels can be grown in the Penola district with some degree of certainty, and will give heavy returns of roots provided the land is well prepared, the crop liberally fertilised, and the land between the rows kept thoroughly cultivated throughout the growing period.

After very thorough soil preparation, about 8 to 10lbs. of seed per acre should be drilled in during October in rows at least 21in. apart, at the same time applying about 3cwts. superphosphate and 1cwt. sulphate of ammonia to the acre.

As soon as the young plants are high enough to be able to see the rows distinctly, the land should be cultivated between the rows, and the plants thinned out to a spacing of about 6 to 8in. apart in the rows. Weeds must be kept down, and the land between the rows be kept loose and open by cultivation throughout the summer.

The crop is fed in the winter, and for the purpose the roots should be lifted and stored in specially-constructed stacks for maturation and preservation, or else be lifted and allowed to wilt for some days before livestock have access to them, or else be lifted, sliced or shredded, and mixed with other foodstuffs such as chaffed hay, crushed grain, bran, &c.

Cereal Breeding and Variety Trials at Roseworthy College, 1936-37

[By E. J. Breakwell, B.Sc.Agr. (Syd.), Plant Breeder, and E. M. Hutton, B.Ag.Sc., Assistant Plant Breeder.]

The Importance and Nature of Disease Resistance in Plants.

Is is quite comprehensible that plant diseases should be the subject of the intensive study which has been devoted to them over the last fifty years. Most parasites of plants are capable, given a suitable host and environment, of causing considerable monetary loss to the grower, and certain of them have, at times, caused sufficient damage to upset the economic stability of the world, and occasionally they have created famines resulting, in former years, in many deaths through malnutrition. It is recorded, for example that the Late or Irish Blight of potatoes completely ruined the potato crop of Ireland in 1845, and in the United Kingdom alone caused damage estimated at £18,000,000. The shortage of potatoes, on which many Irish peasants depended for sustenance, caused the Irish Plague of that year. Fire Blight of apples and pears was responsible, from 1900-1908, for the loss of two-thirds of the Californian pear crop. The same disease, appearing in New Zealand in 1922, made pear growing an impossibility in that country. Stem rust of wheat caused a loss of £60,000,000 to wheatgrowers in the United States of America, and £20,000,000 in Prussia in 1917. In the previous year it had been responsible for a loss of £2,000,000 in New South Wales. Smut of maize, up to 1926, had taken a toll of 70,000,000bush. of maize annually in the United States of America, whilst Venturia scab of apples, before an efficient spraying schedule was adopted, often brought about a reduction in yield up to 75 per cent. The White Pine Blister rust was viewed with such trepidation in America that £130,000 was voted for the investigation of methods regarding its control.

It is not to be wondered at, therefore, that ever since the breeding of plants resistant to certain diseases was first shown to be possible in 1899, plant breeders of nearly all crops have made disease resistance one of their major objectives. Although credit is generally given to Orton, of the United States of America, for being the first successful breeder of disease resistant crop plants, Farrer, of Australia, was working on rust and bunt resistance in wheat before Orton's work was published, and he was successful in producing several varieties which showed tolerance, if not resistance, to one or other of these diseases.

Whilst there are many diseases of crop plants which attack all varieties and species of the crop concerned with equal severity, world-wide explorations have revealed the presence of various types of plant life which exhibit a high degree of resistance to certain specific diseases. It was at first considered that breeding for resistance to Irish Blight would be impossible, but in 1924, a variety of potato was discovered in Japan which exhibited a high degree of tolerance towards the disease, and the breeding programme is now well under way. At one period the huge banana industry of Central America was threatened with extinction by the Panama disease, but breeders subsequently discovered the existence of resistant varieties, the resistance of which was incorporated in commercial types.

Other important plant diseases which are being successfully combated by the plant breeder are the rust and smuts of the cereals, Fire Blight of apples and pears, gumming of sugar-cane, onion smudge, Venturia scab of apples, Anthracnose of beans, flax wilt, many of the virus diseases, and many of the slime moulds which attack vegetable crops.

The reason for the resistance in certain species or varieties to a specific disease which freely attacks closely related forms of the crops has been a matter which has been intensively studied by plant pathologists. The explanations have not always been satisfactory, and the true nature of resistance exhibited by certain crop plants to certain diseases is still a matter for speculation.

It is universally agreed that a plant is resistant to disease because of either morphological, pertaining to the structure of the plant, physiological, pertaining to the inner processes of the plant, or to general functional characters pertaining to the mode of life and growth of the plant. A certain false resistance often appears in crops due to climatic or soil conditions, or to the fact that the crop concerned misses the disease because of earliness or some other factor. A vigorous plant may be able to grow away from a certain disease, whereas in a slightly different environment it might succumb to the pathogen. True disease resistance can only be ascertained by subjecting the varieties or species of a crop plant to a severe natural or artificial epidemic of the disease concerned.

The nature of the resistance in certain varieties and species of wheat to stem rust has been studied most intensively. Various explanations have been offered from time to time, including the strength of the leaf and the proportion of collenchyma to schlerenchyma, the presence of a waxy bloom on the plant, the number of stomata, the number of leaf hairs, the breadth of the leaf, and the thickness of the epidermis. These concern morphological resistance, and whilst some of the explanations apply to certain varieties, they are not satisfactory when applied to all. Functional resistance, pertaining to times of opening and closing of the stomata, through which the infection tube of the parasite enters, was regarded as a possible cause of resistance by another worker, whilst resistance of a physiological character is considered to be the most common by many investigators. Resistance may be due to antagonism between the host and the parasite, or antitoxins may be developed by parasitised plants. The acidity of the cell sap was another hypothesis put forward, and phenolic compounds have been isolated in certain resistant varieties.

The discovery that a number of different physiological forms of rust existed, some of which could attack varieties of wheat which were completely immune to other forms, threatened to complicate the breeding programme, but certain varieties of wheat were subsequently shown to possess resistance or immunity to all forms when mature, even though they might be susceptible to certain forms when in the seedling stage. This is known as mature plant resistance as opposed to seedling resistance. In such varieties, it has been shown that the parasite enters the wheat plant, but due to antagonism, or starvation, or to some such cause, fails to develop and subsequently dies, as do the surrounding cells in the wheat plant, resulting in the characteristic "flecking" exhibited by immune varieties when attacked by rust. The whole problem of rust resistance is most complex, but irrespective of the nature of the resistance, it has been established that mature plant resistance is inherited on a simple Mendelian basis, and thus the project of breeding for rust resistance is simplified.

Less is known concerning the resistance to other cereal diseases. Flag smut of wheat, for example, appears to be able to attack any variety, and results in a certain diminution of the root systems, but only in "susceptible" varieties do the smut lesions appear on the foliage. In the so-called "immune" varieties, the life cycle of the fungus apparently ends before or with the death of the wheat plant.

The whole subject of disease resistance is most complex and interesting. The only real concern of the plant-breeder is, however, the existence or non-existence of varieties resistant to certain diseases, for only in the former alternative can a disease resistant breeding programme be projected.

Wheat Breeding.

Breeding for Disease Resistance.

Much has been written in recent College reports concerning the problem of breeding for improved baking quality, and whilst other objectives have been mentioned, the former has probably, quite unintentionally, overshadowed them. For this reason a full account of that part of the programme which involves the breeding of disease resistant types, the methods which are adopted, the material used, and the possible results of the work will be given herein.

South Australia is generally regarded as a comparatively disease-free State, as far as cereals are concerned. The only two diseases which are really dreaded are "Take All" and stem rust. The former is decreasing in importance, though it is still a potent factor in certain wheat-growing areas, whilst epidemics of the latter are rare, that being one of the compensations of the low humidity and hard finishing conditions prevailing throughout the major portion of the wheat belt. At the same time, the less obvious diseases, flag smut, bunt, leaf rust, loose smut, eelworm, footrot, and *Septoria* take their toll each year, often unknown to the farmer. An elimination of these minor diseases throughout South Australia would undoubtedly result in an increased average yield, and, whilst a total elimination is impossible, the plant breeder has in his hands the means to effect a distinct improvement and it should be possible to combine resistance to nearly all cereal diseases with yielding ability and other desirable characters.

Stem Rust (*Puccinia graminis tritici*).

In centres where Stem Rust occurs with regularity, the breeding of varieties resistant to stem rust is comparatively simple. Under epidemic conditions a range of infection from immunity to complete susceptibility can be discerned and selections made accordingly. For an uninterrupted programme to be pursued, however, infection must be heavy each year, for a number of plants selected in a season when stem rust is absent might prove completely susceptible when the disease occurs in a severe form.

Farrer was cognisant of the importance of breeding for rust resistance, but his only real contribution was in the form of early wheats which were rust escaping rather than rust resisting. The same applies to Early Gluyas, selected in South Australia, which, although usually free from rust, suffers severely if the epidemic occurs early in the year. The chief difficulty encountered by early breeders was that of the paucity of suitable rust resisting parents for use in the breeding work. To Roseworthy College came the credit of breeding the first commercial variety with moderate rust resistance, for the variety Ford, released in 1912, combined productiveness with the ability to return normal yields under all but very severe conditions of rust infection. In this case the character for rust resistance probably came from Tardent's Blue, one of the grandparents of the wheat. Chiefly due to this character of rust resistance Ford is now one of the three leading wheats in Australia, and, although it is more important in the Eastern States than in South Australia, it exemplifies the demand which exists for a high yielding, rust resistant wheat. Other commercial varieties, such as Nabawa, Baringa, Currawa, Ghurka, Florence, and Sword, possess a field resistance to the disease, but most varieties grown in South Australia, such as Ranee 4H, Waratah, Free Gallipoli, Late Gluyas, Aussie, Merridin, Dundee, King's White, Felix, Sultan, and Nawab, are highly susceptible and, in the event of a heavy rust epidemic, growers of these varieties would certainly suffer considerable monetary loss.

The problem has been altered somewhat in the last ten years, owing to the introduction into Australia of varieties possessing a very high degree of resistance or immunity to the disease. Most notable of these wheats are those from America, including Hope, Marquillo, Webster, Khapli, Pentad, from the United States, and a series of wheat from the Dominion Rust Laboratory in Canada, and wheats from Kenya Colony, South Africa. The majority of these varieties, being unsuitable for South Australian conditions, have been crossed with commercial varieties in an endeavour to incorporate the character of rust resistance into Australian wheats. Observations at Roseworthy over three years have indicated that the American wheats, apart from their disease resistance, are not very suitable as breeding material. In the first place the grain is red and the colour is governed by three factors, except in Marquillo, in which two factors operate. The recovery of white grained segregates in the second or later generations is therefore tedious, although possible. The infrequent occurrence of white grained plants considerably narrows the field of selection. Secondly, the American wheats are remote from the Australian type in agronomic characters, being, as a rule, tall and weak in the straw, with a rather small lean tapering head, often bearded. They are late maturing and will not stand up to the hot, dry finishing conditions often experienced at Roseworthy. They do, however, possess good to excellent baking quality, and it is certainly worth while persevering with them in the hope that the desired combination will be effected.

Much more promising is the material from Kenya Colony. These include some soft white grained wheats, not unlike the Australian type. They are almost immune to stem rust, though they have not the resistance of the American wheats to other diseases, and are generally of inferior baking quality. Lines from crosses containing Kenya wheats, however, are distinctly promising and high yielding segregates have been obtained at Roseworthy, which are almost immune to stem rust.

It is doubtful whether a very high resistance to the disease is necessary for South Australian conditions, and the grower would probably be satisfied if wheats were produced which could withstand the ravages of stem rust as well as do Ford and Sword. In practice, however, under Roseworthy conditions it is almost impossible to select for moderate resistance, as in most years the rust lesions are not sufficiently thick to permit this finer differentiation. An attempt is made, each year, to create an artificial epidemic in a small enclosure. Within this enclosure a single row of each line which, on parentage, might possess some rust resistance, is planted late in the season. Flaggy, soft growth is encouraged by frequent irrigations, and in the late spring, rows of susceptible varieties throughout the plots are inoculated with spores of stem rust and the disease is encouraged by keeping up the humidity by means of a sprinkler. In the season 1936, a degree of infection approaching epidemic form was obtained and this permitted valuable observations on the relative degrees of resistance of the numerous crossbred lines. In the field plots, selection, in the main, was restricted to those lines which had exhibited rust resistance in the "rust enclosure." Incidentally, most of the lines containing one of the Kenya wheats had some resistance and often immunity. The varieties Sword and Ford under such conditions become covered with rust lesions, although the grain is not affected, but it is difficult to select plants with moderate resistance, the artificial epidemic created being insufficiently uniform throughout the rows.

Thus, breeding for rust resistance at Roseworthy is beset with difficulties, but, in view of the importance of the work, it must be persevered with. In centres where rust appears with regularity it is easier, but in such high rainfall areas the lines selected are often unsuitable for the "hard" conditions which exist in the wheat belt proper. Indeed, the two most successful wheats in Australia to-day, which combine rust resistance and drought resistance, were bred at Roseworthy, and a repetition of such success as has been obtained in the past should not be impossible.

Flag Smut (*Urocystis tritici*).

Flag smut is an insidious disease in that the damage it causes is not obvious. A close scrutiny of many wheat crops throughout the State, however, would reveal many tillers, and often plants, killed by the disease. Whilst the surviving tillers and plants might benefit somewhat by this "thinning-out," the damage caused by the disease is often appreciable, particularly under the wheat–fallow–wheat rotation, if a susceptible variety is persevered with. The incidence of flag smut depends largely on environment, and while the amount of potential infection may be increased from year to year, the disease may only become serious when suitable conditions prevail at the time of grain germination. While the position regarding flag smut cannot be considered as serious, breeding for resistance to the disease is included in the wheat-breeding programme at Roseworthy. All crossbred lines, before seeding in the hand plots, are inoculated with flag smut spores collected during the previous season. Highest infection is obtained usually with the earlier seedings, but with all seedings, the disease is sufficiently obvious to permit selection for resistance. The task of breeding for flag smut resistance is much simpler than in the case of stem rust, for infection is easy to obtain and there are a large number of good commercial wheats which possess a high degree of resistance to the disease. Two South Australian wheats, Dan and Tuela, are immune, to all intents and purposes, whilst a number of other varieties, such as Nabawa, Ghurka, Carrabin, Dundee, Ford, Geeralying, Bencubbin, Riverina, Baringa, Currawa, and Pusa 4 possess a high degree of resistance. Many of the important commercial varieties, however, such as Ranee 4H, Early Gluyas, Late Gluyas, Waratah, Gallipoli, Aussie and

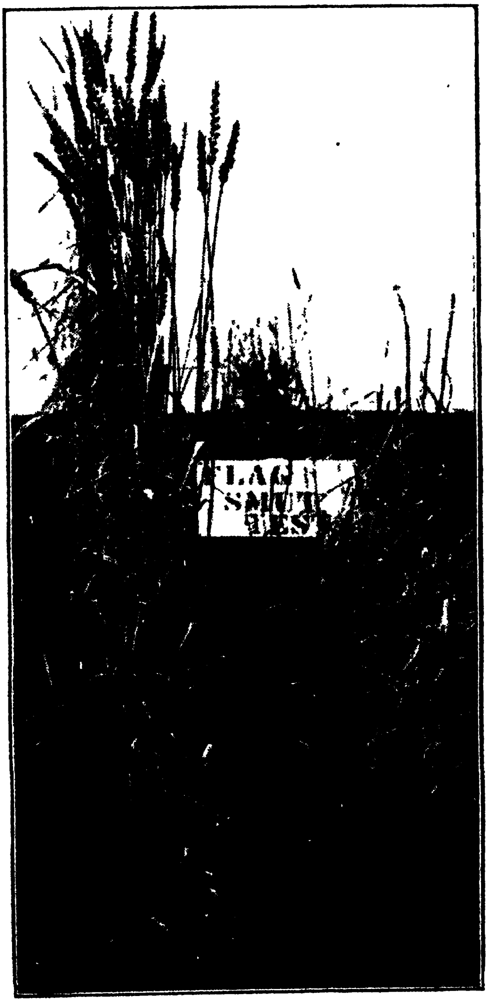


Fig. 1.—Flag Smut. Two rows of wheat, each representing a different selection from the same cross. Both rows were inoculated with flag smut, and received identical treatment. The original cross was between a resistant and a susceptible parent.

Merridin, Florence, Sultan, Felix, Caliph, Nawab and King's White are highly susceptible and the replacement of these varieties with resistant types, providing it could be accomplished without sacrificing yield, would be an appreciable contribution to the wheat industry.

Whilst strains are seldom rejected outright, at Roseworthy, on the score of flag smut susceptibility, it is pleasing to note that the larger proportion of the lines in the advanced generations possess from a moderate resistance to immunity to the disease.

Leaf Rust (*Puccinia triticina*).

Leaf rust, or spring rust, is much more common under South Australian conditions than is stem rust, but is not considered to be of much importance. In years when available moisture is low, however, it is feasible that a crop heavily infected with leaf rust will suffer more severely through lack of water than will a healthy crop, the reason being that even a mild infection of leaf rust greatly increases the moisture requirements of the plant. Under normal spring conditions the damage caused by the disease is probably only very slight. Observations are made each year on the incidence of leaf rust in the plots, but breeding for resistance to the disease has not been incorporated in the wheat breeding programme, although notice has ben taken in the past of those lines which regularly show some resistance. Many of the American wheats are resistant to both stem and leaf rust, and it is quite possible that if varieties do evolve, having American parentage, they will possess resistance to both species of rust.

Of the commercial varieties, all appear to be very susceptible. Bordan, Dindiloa, Joffre, Sepoy, Sirdar, and Thew have some resistance to the disease, but high resistance or immunity is restricted to uncommon Australian varieties and foreign wheats.

Loose Smut of Wheat (*Ustilago tritici*).

Loose smut of wheat is a disease which causes some concern to farmers, chiefly because it is so very conspicuous at heading time. Actually, unless smutted seed is used year after year, the disease should not be troublesome, and the obvious remedy for the farmer is a change of seed when his own becomes more than normally infected. Pure seed institutions, such as Roseworthy College and Turretfield, attempt to keep their

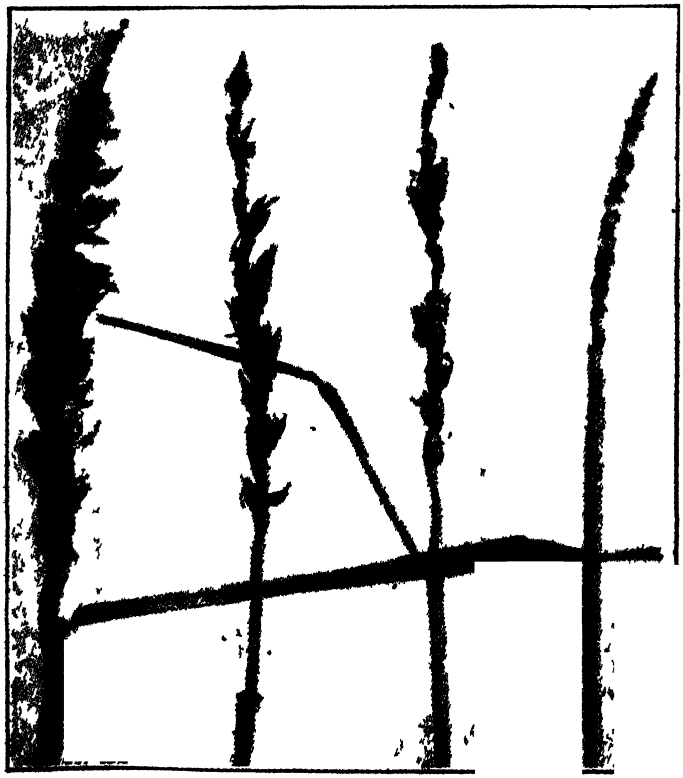


Fig 2.—*Ustilago tritici*, Loose Smut of Wheat.
(*From Heald's "Plant Diseases."*)

crops relatively free from loose smut by hand roguing and, if necessary, by the hot water treatment, which is much too difficult for the farmer to attempt.

The breeding for resistance to loose smut involves floral inoculation with the spores of the disease, a laborious task that has of necessity, to be undertaken at a very busy time of the year and which has not yet been attempted at Roseworthy in view of the comparative mildness of the disease in South Australia. A number of American varieties have a high resistance, the most notable being Hope, and in view of the fact that there is a great deal of crossbred material containing Hope as a parent in Australia at the present time, it is feasible, that if commercial varieties are evolved from this material, they may possess resistance to loose smut. To make a definite point of breeding for loose smut resistance, however, would involve more time and labour than the problem at present warrants.

Bunt (*Tilletia tritici*)

Pickling seed wheat is an almost universal practice with farmers, and it has materially lowered the incidence of bunt throughout Australia. The objection to bunt is due, not so much to the loss of yield as to its effect upon the flour, for the spores give the mill products an unpleasant odour, and millers very rightly object to the presence of bunt in wheat.

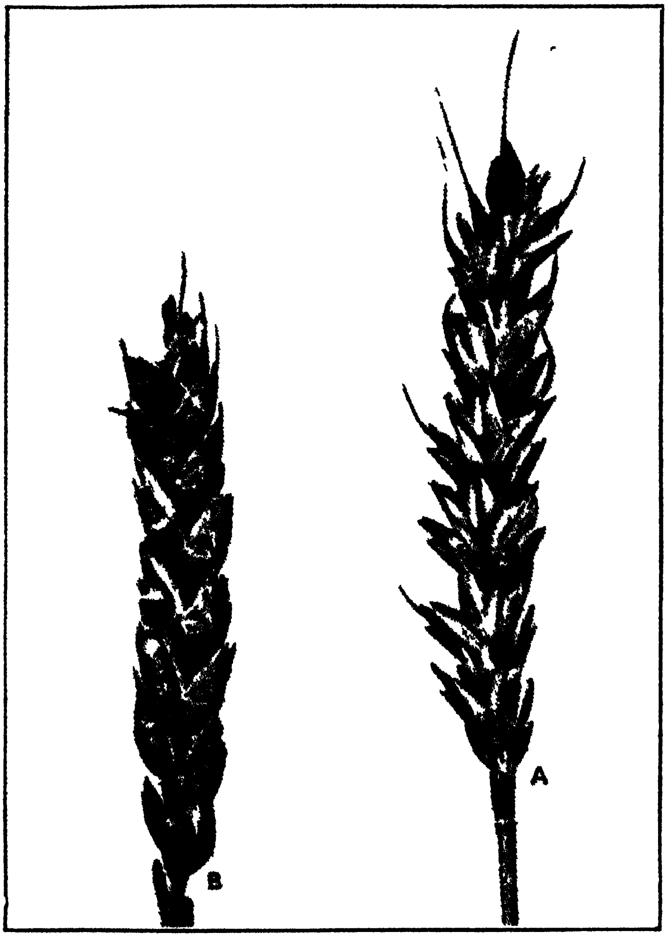


Fig. 3.—Ears of Wheat with Bunt A Ear showing spikes standing out from axis and somewhat separated B Ear with glumes removed to show the bunt balls and grains.

(From McAlpine's 'Smuts of Australia")

The breeding for resistance to bunt, like flagsmut, is comparatively simple in that it is easy to obtain a heavy plot infection. By inoculating the seed samples with spores collected during the previous season, and planting late, a heavy infection can be obtained in susceptible varieties and strains. Crossbred material which, on the basis of parentage, might possess resistance to the disease, is infected in this manner, and selections are made from those lines showing some resistance. Resistance to the disease is possessed by a number of commercial varieties, and this simplifies the breeding programme. The resistant varieties include Baringa, Dindiloa, Florence, Minflos, and S.H.J., and some crossbred lines in advanced generations containing one of these in the parentage possess at least a moderate degree of resistance.

Take-All (*Ophiobolus graminis*) and Root Rots (*Helminthosporium, Fusarium, &c.*).

This group (Take-all and Root Rots) contains a number of pathogens, and may be regarded as the most serious disease of wheat in Australia. The annual damage has been estimated at £700,000, and it is higher in some seasons. Whilst, from accounts, some varieties show tolerance to the diseases, evidence is contradictory, and no variety has yet been discovered which possesses a true resistance to take-all or to the root rots. This, of course, quite apart from other difficulties, makes a breeding programme impossible and, for the present, farmers must rely on cultural methods for control.

Soil and climatic factors appear to be all-important in the incidence of take-all and the footrots. It has been suggested that the acidity of the soil is the main factor governing the occurrence of take-all, since wheat grown in acid soils is practically free from the disease, while on alkaline soils the disease is often very serious. In addition, on soils rich in organic matter, take-all is less prevalent than on virgin soils low in humus. On the other hand, relatively dry, warm spring conditions often lead to serious attacks of the footrots on soils with a high organic content.

Eelworm (*Heterodera Schachtii*).

Eelworm is becoming more and more obvious throughout the wheat belt, often ruining large patches of crop. For its control the Plant Breeder can offer little help, and the only method of attack, again, is by cultural operations.

The incidence of eelworm appears to be associated with the vigour of the crop. Stubble-sown cereals, particularly oats, are prone to attack. A high nitrate nitrogen level in the soil, combined with good tilth and germinating conditions, enables the crop to establish a vigorous rooting system which might be attacked, but is not seriously affected by the parasite.

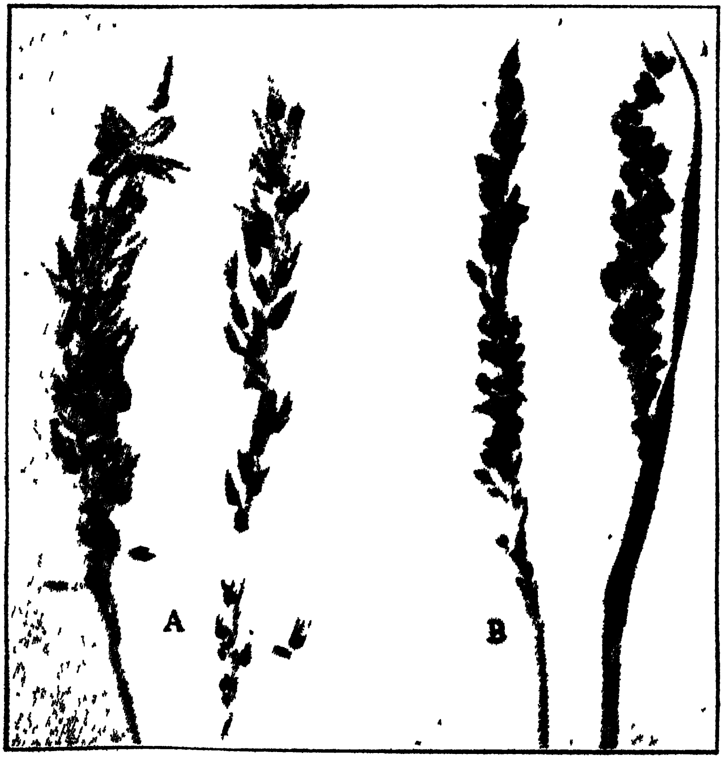


Fig. 4.—Oat Smuts. A. Kernel smut (*Ustilago levis*). B. Loose smut (*Ustilago avenae*).
(*From Heald's "Plant Diseases."*)

Septoria tritici.

Septoria tritici, which causes the brownish patches of the leaf which are studded with the small black fruiting bodies, is not of sufficient importance to warrant attention.

Diseases of Barley.

Loose Smut (*Ustilago nuda*) and Covered Smut (*Ustilago hordei*).

Loose Smut and Covered Smut occasionally cause concern to barley growers and, in the case of the latter, pickling with formalin is sometimes resorted to. No breeding work for resistance to the diseases is being carried out as all the suitable agronomic types are susceptible. The mercurial pickles now on the market may afford some relief to growers, for they are much more convenient to handle than is formalin and give effective control to Covered Smut.

Leaf Stripe (*Helminthosporium gramineum*).

Leaf Stripe may also be controlled by these dusts.

Diseases of Oats.

Loose Smut (*Ustilago avenae*) and Covered Smut (*Ustilago levis*).

Loose Smut and Covered Smut of oats are often noticed in a crop though they are seldom serious. A number of varieties grown in South Australia appear to possess some resistance to the smuts. These include Fulghum, Mulga, Early Burt, and Guyra. Crossbred material containing these oats in their parentage will be inoculated with spores of the smuts and their resistance tested.

Selective Work with the Varieties Sword and Ford.

Because of the apparent mixture of types in these two varieties, they were subjected to selection in 1933. Selections were made for baking quality as well as for agronomic characters, and results dealing with the former aspect have already been detailed. (¹)

The position with Ford is that eight strains are being persisted with, all of which are uniform, and some possess superior baking quality and are not so prone to shattering as is the commercial strain. By the harvest of 1937 the final type will be decided upon, and the seed multiplied for distribution to farmers.

In the case of Sword, the selective work shows every indication of being successful. A strain, Sword 13, has been isolated, which is not only superior in quality to commercial Sword, on the basis of the Pelshenke Test, but holds its grain well, is earlier, uniform, free from purple straw, possesses greater resistance to stem rust, and outyielded the commercial Sword last season, in spite of the fact that the late rains favoured the latter. It is somewhat different from Sword in appearance and, pending results from the 1937 harvest, it will be renamed and released.

Crossbred Material.

Results from the Advanced Crossbred yield trials are as follows:—

Mid-Season Group—Ranee 4H Standard—Pelshenke 38.

Crossbred.	Percentage Yield of Standard.	Pelshenke Figure.	Remarks.
Gluyas x Egyptian 4)^6 G.12	109	52	Prolific ; drought resistant
Onas x Nabawa)^6 G.3	103	64	Dual purpose type ; drought resistant ; resistant to flag smut
Onas x Nabawa)^6 G.1	100	61	Dual purpose type ; drought resistant ; resistant to flag smut
Nabawa x Egyptian 4)^6 G.3	99	103	Exceptionally good grain ; drought resistant ; flag smut resistant ; dual purpose type
Nabawa x Egyptian 4)^6 G.5	97	100	Exceptionally good grain ; drought resistant ; flag smut resistant ; dual purpose type
Early Group—King's White Standard—Pelshenke 32.			
Ford x Merridin)^7 G.11 ..	120	57	Merridin type
Ford x Merridin)^7 G.15 ..	119	57	Merridin type
Ford x Merridin)^7 G.10 ..	111	72	Merridin type
Nabawa x Canberra)^6 G.8	109	54	High yielding, short strawed type
Ford x Carrabin)^7 G.4....	100	99	Excellent grain ; dual purpose type
Ford x Carribin)^7 G.8		78	Good grain ; dual purpose type

It will be noticed from the above tables that the crossbreds, which gave satisfactory returns for grain, all possess a Pelshenke figure of more than 50, that being the standard set by the College. The grain of the lines from the crosses Nabawa x Egyptian 4 and Ford x Carrabin is of premium quality, being hard and flinty, and both crosses might prove suitable for the earlier districts. Further field testing is necessary, however, before they can be released. In the earlier generations, the following crosses are showing some promise:—Sword x Dundee)^{5}, Dundee x Ghurka)^{5}, Riverina x Ford)^{5}, Gallipoli x Sword)^{4} x Dundee)^{5}, Baringa x Gluyas)^{5}, Dundee x Gullen)^{5}, Nabawa x Dundee)^{5}, Gluyas x Dundee)^{5}, Waratah x Sword)^{5}, Cadia x Sword)^{6}, Tuela x Pusa 4)^{5}, Dan x Baringa)^{5}, Ghurka x Minflos)^{5}, and Nabawa x Dan)^{5}. Lines from these crosses yielded well in the drill strips at Roseworthy, and also at Urania and Wepowie. In addition, their quality is satisfactory.

Crosses in the second and third generations are mostly the result of multiple crosses, and involve three or more varieties in their parentage. These will be given their first test in the drill strips in the 1937 and 1938 seasons, when they will be grown at Roseworthy, Wepowie, Urania, Yeelanna, and Mundalla.

Wheaten Variety Trials.

Mid-Season Group.

A number of varieties were tested during the season of 1936. Results are:-

Variety.	Yield per Acre.		Percentage Yields.		
	Bush.	Lbs.	1936.	1935.	1934.
Ranee 4H	**34**	**8**	115	120	85
Nawab	**33**	**52**	114	119·5	122
Bencubbin	**33**	**32**	114	91	—
Sword	**32**	**32**	110	108	114 (a)
Gluyas Selection	**32**	**24**	110	—	—
Dundee	**31**	**20**	106	113	109 (b)
Baringa	30	44	104	139	115 (b)
Ford	29	40	100	—	—
Nabawa	29	40	100	100	100

(a) Waratah standard.
(b) Ford standard.
S.E. = 2·74 per cent. Significant difference = 105·6lbs. per acre.
Yields significantly superior to that of the standard (Nabawa) are in black type.

Ranee 4H.—Once again, both in the field and in the variety trials, this variety has acquitted itself well, and it is a very "safe" wheat for mid-season planting.

Nawab has been an outstanding variety at the College for a number of years. Although it is susceptible to all diseases and shatters slightly it is an excellent dual-purpose type, particularly for the lighter soils.

Bencubbin is rapidly increasing in popularity, and the indications are that it will replace Nabawa in this State as it has already done in Western Australia. Very similar in type to Nabawa, it apparently possesses greater yielding ability.

Sword is a very consistent performer, which is becoming increasingly popular. Although an uneven variety it yields well on the limestone soils.

Gluyas Selection was evolved at the Waite Institute. It is later than Early Gluyas and a prolific wheat, but, on account of its poor quality and its tendency to pinch in the grain, it is not recommended.

Dundee has also increased rapidly in popularity over the last three years, and there is no doubt that it is a prolific wheat under most conditions. The baking quality of this variety has met with some criticism. The experience at the College is that good sound samples of Dundee, free from "yellow berry" or "mottling," are invariably of good quality, but it appears to be a variety which fluctuates tremendously in this respect. A sure indication of inferior baking quality is the appearance of "yellow berry," and when this is present the grower should not look for a premium. "Yellow berry" is usually associated with a favourable finish and thus, in those districts where Dundee does best, it is most subject to this deterioration. The variety, however, in spite of its fleshy appearance, stands up to hot dry weather reasonably well, and whilst it is unsuited for the marginal areas, it has given satisfactory grain returns in districts of comparatively low rainfall.

Baringa has done exceptionally well in the yield trials since it was introduced to the College four years ago. In the field it has not lived up to its early promise, the chief contributory cause being that it will not compete with weeds. A shy stooler, it must only be sown in clean ground, and preferably at an increased seeding rate. In spite of its yielding ability, however, it will not be recommended by the College in the future. Its hard, flinty grain is troublesome to the miller, and, in view of the possibility of high-quality varieties becoming popular in South Australia, it was thought wiser not to encourage the cultivation of Baringa, as its grain, which has rather poor baking quality, would complicate the marketing of premium wheats as it has already done in New South Wales.

Ford is rather too late for Roseworthy conditions, and although its appearance in the early part of the season usually augurs well for high yields, it has not given a really good return for some years. It is rust-resistant, and gives a good hay yield, and for these reasons alone it is still being grown at the College.

Nabawa has always been a shy yielder under Roseworthy conditions, and, in view of the apparently greater productiveness of varieties such as Bencubbin and Ranee 4H, its cultivation is not recommended under soil and climatic environments similar to those prevailing at Roseworthy.

Early Group.

Variety.	Yield per Acre.		Percentage Yields.		
			1936.	1935.	1934.
	Bush.	Lbs.			
Sword	**32**	**16**	110	110 (a)	114 (a)
Merridin	30	28	103	*99 (a)	102 (a)
Aussie	30	12	103	*116 (a)	106 (a)
King's White	29	28	100	—	—
Gular	**27**	**24**	93	—	—
Carrabin	**27**	**24**	93	127 (a)	—
Florence	**24**	**36**	83	97 (a)	122 (a)
B.I.P.M., 2903	**20**	**32**	69	121 (a)	—

(a) Waratah standard.
* Difference in yield probably due to seed.
S.E. = 2·77 per cent. Significant difference = 92·8lbs. per acre.
Yields significantly different from that of the standard (King's White) are in black type.

Merridin and Aussie are similar, exhibiting only very slight differences in the early stages of growth. The two varieties are becoming popular for early seeding, for, although susceptible to all diseases, they fill the heads remarkably well under all but very dry conditions.

King's White was selected at Roseworthy College in 1906, and has been grown here for 30 years. It is susceptible to disease, but has not yet been replaced by any other wheat for late planting. A dual-purpose type, it has given excellent performances on the College farm season after season. Unfortunately the baking quality of the grain is rather poor.

Gular came from New South Wales with a high reputation for baking quality. It is an attractive wheat, but did not yield up to appearances, and must be tested further before it can be recommended. It is essentially a wheat for the earlier districts.

Florence is invariably penalised by excessive shattering. It has never been a successful wheat at Roseworthy and, in spite of its superior quality, it cannot be recommended for similar districts.

B.I.P.M. 2903, a Queensland crossbred, is so early that it received no advantage from the late rains. Its use under South Australian conditions is doubtful, and it has been rejected.

Oaten Trials.

Two series of trials were sown in 1936, one on stubble land for grain and hay and the other on fallow land for grazing, grain, and hay. The former had to be abandoned, for all stubble crops were failures at Roseworthy in 1936. The returns from the oats, sown on well-prepared fallow, were, on the contrary, excellent, and serve to emphasise the monetary return which might be expected from this crop if given good treatment and handled correctly.

The plots were grazed with sheep twice, cuts being taken before grazing to estimate the weight of green matter produced. After the second grazing they were allowed to mature, and one-half of each plot was cut for hay, and the other for grain. The results obtained are set out hereunder:—

Late Group—Hay and Grain Returns—Algerian Standard.

Variety.	Hay.				Grain.		
	Yield per Acre.			Percentage Yield.	Yield per Acre.		Percentage Yield.
	Tons.	Cwts.	Lbs.		Bush.	Lbs.	
Algerian	2	14	59	100	39	8	100
New Zealand Cape	2	12	98	97	**33**	**36**	86
Early Kherson ...	**2**	**9**	**11**	90	**54**	**20**	139
Sunrise Selection .	**1**	**19**	**69**	70	**32**	**36**	84

S.E. = 2·09 per cent. for hay and 5·68 per cent. for grain. Significant differences = 205lbs. per acre for hay and 183lbs. per acre for grain.

Yields significantly different from that of standard (Algerian) are in black type.

Early Group—Hay and Grain Returns—Early Kherson Standard.

Variety.	Tons.	Cwts.	Lbs.	Percentage Yield.	Bush.	Lbs.	Percentage Yield.
Fulghum	**2**	**9**	**105**	108	**31**	**28**	54
Early Kherson Seln..............	**2**	**9**	**47**	107	**66**	**24**	113
Guyra	2	7	91	104	**52**	**8**	90
Gidgee	2	7	77	104	**38**	**24**	66
Early Kherson	2	6	5	100	59	24	100
Mulga	2	3	75	95	**42**	**28**	73

S.E. = 2·84 per cent. for hay and 5·63 per cent. for grain. Significant differences = 269lbs. per acre for hay and 218lbs. per acre for grain.

Yields significantly different from that of standard (Early Kherson) are in black type.

Yields of Green Matter.

Variety.	First Cut per Acre. Tons.	Second Cut per Acre. Tons.	Total per Acre. Tons.	Percentage Yield.
New Zealand Cape	2·8	4·5	**7·3**	120
Early Kherson	2·7	4·8	**7·5**	123
Sunrise Selection	2·3	3·1	**5·4**	89
Algerian	2·0	4·1	6·1	100

S.E. for first cut = 4·48 per cent., and for second cut = 7·41 per cent. Significant difference for total = 0·3 tons per acre.

Yields significantly different from that of standard (Algerian) are in black type.

Mulga	2·1	1·8	**3·9**	65
Early Kherson	2·0	4·0	6·0	100
Early Kherson selection	2·0	3·9	5·9	98
Fulghum	2·0	3·5	**5·5**	93
Guyra	1·7	2·2	**3·9**	65
Gidgee	1·5	1·9	**3·4**	57

S.E. for first cut = 6·8 per cent., and for second cut = 7·02 per cent. Significant difference for total = 0·36 tons per acre.

Yields significantly different from that of standard (Early Kherson) are in black type.

The trials clearly demonstrate the superiority of *Early Kherson* for Roseworthy conditions, both for early and late planting. The variety should not be sown early, of course, unless it is intended to graze it at least once. Few varieties come away faster, and it makes an excellent recovery even after the second grazing, as the exceptionally good hay and grain yields demonstrate. *Early Kherson Selection* was the only variety which approached it for all-round excellence. This strain is a Roseworthy selection, very similar to Early Kherson, being slightly taller in the straw. In the late group, *New Zealand Cape* gave a greater yield of green matter than Algerian, but failed to recover as well after the second grazing.

Fulghum is another oat with possibilities. It generally gives good grain returns, but in 1936 it was penalised by shattering, due to the fact that it was ripe before the rest of the trial. It is rather weak in the straw.

Guyra is definitely superior to *Gidgee* in all departments. Both produced excellent samples.

Mulga gave exceptionally good early growth. It was at a disadvantage in the grazing trial as it is very sweet, and the sheep ate it bare to the ground in preference to the early varieties.

The returns for the paddock are particularly high for such a dry season. On stubble land at Roseworthy the experience has been that oats will not mature into a respectable crop if grazed more than once. If high returns, both from the point of view of green matter and hay or grain, are to be expected from oats they must be sown on fallow, when soil and climatic conditions are similar to those existing at Roseworthy. Sown on a really good fallow, they can be a particularly valuable crop. A vigorous oat will provide an abundance of greenfeed for milking ewes and for lambs up to the beginning of August, and then mature into a payable crop. Indeed, in most years, it is preferable to graze them up to July to prevent rankness in growth and lodging.

The 1936 season was such that the recovery after the second grazing was materially assisted. But for the late rains the returns would not have been so high. The average yield from the block, which was sown on a particularly good fallow, was 45bush. per acre. Considering that approximately 5½ tons per acre of green matter had been removed by sheep during the winter, this grain return must be regarded as exceptional, but it does illustrate that oats should not be relegated into the position of a stubble crop only. For the fat lamb grower, particularly, they might, quite conceivably, prove to be the most valuable fallow crop he can grow.

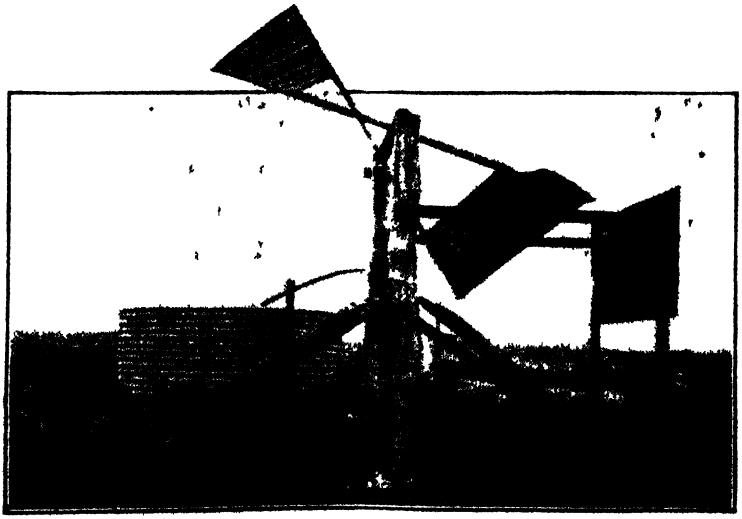
Barley Trials.

Promising crossbred lines from the cross Prior x Beavan's Special are now fixed, and were first tested in the field in 1936. The season was a very bad one for barley and yields were low, but some of the lines withstood the dry conditions and outyielded Prior. There is also some promising material in the cross Prior x Roseworthy Oregon. Results are as follows:—

Strain.	Yield per Acre.		Percentage Yield.
	Bush.	Lbs.	
Prior x Roseworthy Oregon	18	41	125
Prior x Beavan's Special 38	18	16	121
Prior x Beavan's Special 37	17	42	119
Prior x Beavan's Special 32	15	2	101
Prior	14	48	100

A number of barley crosses have been made in the past, the main objective being to incorporate malting quality into a six-rowed type. Whilst high malting quality is probably strongly associated with the two-rowed barleys, there is a possibility of combining at least fair quality with the six-rowed species. Most of this material is at present in the third generation so it will not be ready for field testing for some time.

(1) Breakwell, E. J., The Baking Quality of Australian Wheats. No. 3, Breeding Wheats of Better Baking Quality. Jour. of Agric. S.A. 37: 1532.



A simple but effective Windmill on Mr S. J Bonney's Dairy Farm, Glencoe.

The "Grasshopper" Problem in South Australia

[By H. G. Andrewartha, M.Ag.Sc., J. Davidson, D.Sc., and D. C. Swan, M.Sc.,
Waite Agricultural Research Institute University of Adelaide.]

I. Introduction.

Owing to the widespread plague of "grasshoppers" over the southern and eastern regions of Australia during 1933 to 1935, the Australian Council of Agriculture recommended that more extensive investigations should be made on the locust and grasshopper problem in Australia in addition to the work already being carried out by Departments of Agriculture in the various States concerned. The Department of Entomology of the Waite Agricultural Research Institute is investigating the problem in South Australia, in co-operation with the State Department of Agriculture. Close contact is maintained with officers of Departments of Agriculture and the Commonwealth Council for Scientific and Industrial Research working on the problem in other States.

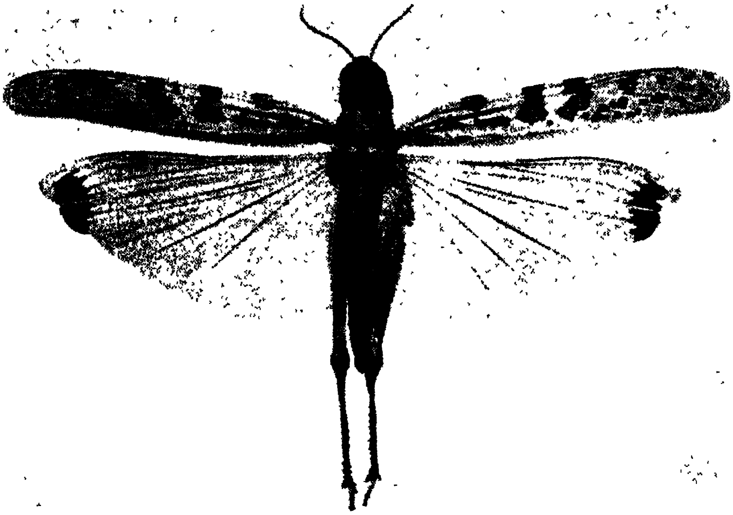


Figure 1.—The black-tipped locust (female).

Newspaper reports and records in the various Journals of Agriculture show that "grasshopper" outbreaks have occurred in Australia, from time to time, since the early days of settlement. Serious losses have been caused by these insects, particularly in the wheat belt and the grassland areas bordering on this zone. The scientific development of pastures and crop production in recent years, with the consequent improvement in the stock-carrying capacity of the land and increase in crop yields, has resulted in a greater realisation of the economic importance of locusts and grasshoppers. This applies not only to Australia, but also to other countries subject to plagues of these insects. Investigations on these matters have attained some degree of Empire co-operation in recent years. In April, 1929, a sub-committee of the Committees of Civil Research, with headquarters in London, was appointed by His Majesty's Government to inquire into the problem of the "desert locust" of Western Asia and Northern Africa.

Periodic outbreaks of this species result in losses in British territories in these regions. In January, 1930, the sub-committee became the "Locust Committee" of the Economic Advisory Council, and the scope of its inquiries was extended to include investigations on other species of locusts in tropical Africa. In association with the Imperial Institute of Entomology and workers in the various territories concerned, the Committee has arranged for detailed investigations to be carried out. A series of valuable progress reports on this work has already been published. A wider, international aspect of the investigations has been developed by the inauguration of a series of International Locust Conferences. The fourth Conference was held in Cairo in 1936, to which all countries subject to locust and grasshopper plagues were invited to send a representative. Australia was represented at this Conference. The general features underlying causes of these plagues, and control methods, are much the same in all countries. · Each country, therefore, can gain something from the results of investigations going on in other countries.

II. Life History and Habits of Grasshoppers and Locusts.

Grasshoppers and locusts belong to the same family of insects. Some 300 different kinds are known to occur in Australia, but only about half a dozen of these species are of serious economic importance. In general, the insects inhabit principally the drier grassland areas, extending into the pastoral country. Normally, they live as solitary individuals scattered over these areas. In some years they are present in greater numbers than in other years. A few species have developed the habit of congregating into dense swarms and developing into plagues from time to time. These species are of great economic importance to Agriculture owing to the enormous numbers of individuals which are produced. The insects eat the green herbage and advance in swarms over the countryside, being a menace to pastures and crops. Fortunately, only a few of the species of grasshoppers have developed this swarming habit to a marked degree.

The general features of the life history are much the same for all the plague species. The adult females lay eggs in suitable situations in the ground; they are laid in packets or pods to a depth of two to three inches. The number of eggs in each packet varies according to the species; with many species it is about 50. When the season favours increase in the numbers of a plague species, the insects exhibit what is known as the "swarming phase." Under these conditions the winged adult mass together and migrate in swarms. They congregate on suitable sites for egg laying which are known as "egg beds.". The egg beds vary in extent, according to the size of the swarms; some may extend over several acres, and each square inch of this area may contain one or more egg pods. The eggs can remain dormant and viable in dry soil for many months. When soil moisture is adequate, and favourable, warm temperatures obtain, wingless "hoppers" hatch from the eggs. They mass together, feed on the herbage and advance in dense bands across the country, feeding as they advance. The hoppers increase in size and eventually develop into adult, winged males and females, which fly about in swarms. The winged swarms may migrate considerable distances, depending upon the habits of the species, the weather and the availability of food. With the laying of eggs by these swarms, the life cycle is completed and a further generation is initiated when the hoppers hatch from them. The time taken after hatching for the insects to become mature adults, depends to a large extent upon temperature and the availability of adequate food and moisture. Under summer conditions in South Australia it is about six weeks.

III. Two Important Plague Species in South Australia.

Two species inhabiting South Australia develop into plague numbers in some years, and are of great economic importance in this State. One of these species, the "black tipped locust" (*Chortoicetes terminifera* Walk), developed into a widespread plague in 1933 to 1935. It is widely distributed over Australia and during this period it occurred also in plague numbers over Northern Victoria, the Western areas of New South Wales and the south-western areas of Queensland. During the present summer outbreaks have occurred over a large part of the Western districts of New South Wales. The winged adults are easily recognised by the black patch on the tip of each of the hind wings. (Figure 1). In South Australia, the species can be found every year as isolated individuals or as loose aggregations, in various situations over the drier areas of the State. In

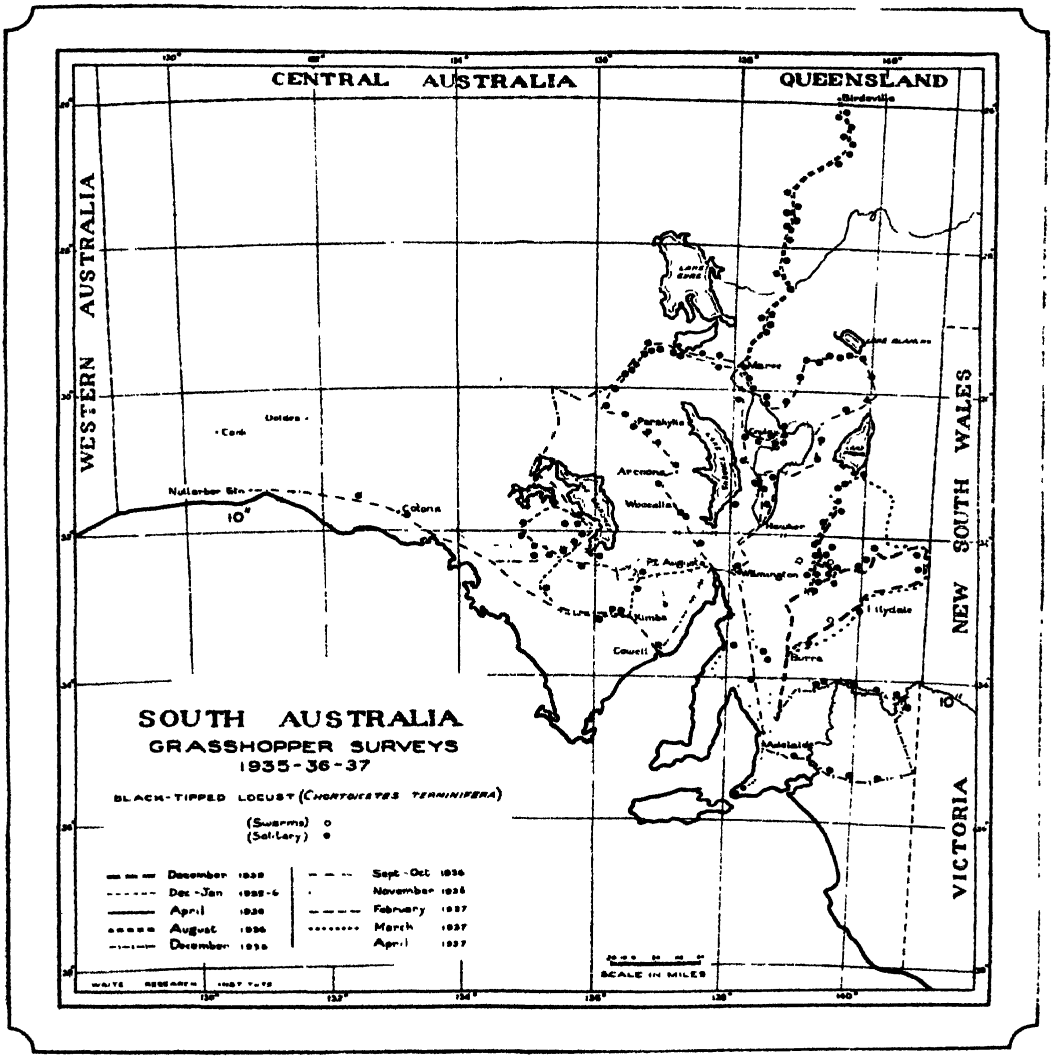


Figure 2.—Showing the distribution of the black-tipped locust in South Australia, as recorded by means of survey tours.

the pastoral country, extending northwards from about the 10 inch line of annual rainfall, it permanently inhabits certain local areas such as water courses, creek beds, and similar favourable situations. (Figure 2). It may generally be found in these places either as solitary individuals or as loose aggregations of individuals. It is in parts of these northern regions of the State, which are subject to irregular summer rains, that plagues of this locust are initiated. An account of the ecology of this species has been given in a recent publication. (Davidson, J. 1936, Trans. Roy. Soc. S. Australia, Vol. LX., pp. 137-152).

The other plague species may be described as the "plague grasshopper" (*Austroicetes cruciata* Sauss). It is a smaller insect; the hind wings are clear, without the characteristic black tip of the previous species. (Figure 3). The males develop a characteristic yellowish colour. The plague grasshopper mainly inhabits a belt of country extending across the State over the northern portion of the wheat belt and the adjoining pastoral country. (Figure 4). In some years it multiplies into dense numbers and is a menace to wheat crops and grasslands in these areas. To a lesser extent, the species occurs in the drier districts of the southern agricultural areas. Although this grasshopper forms into dense swarms, both in the wingless hopper stages and in the adult, winged stage, its migrating habits consist only of local migration in the country where it permanently lives. This restricted range of migration is one of the essential features which distinguish grasshopper swarms from swarms of locusts. The latter insect may be considered as swarming grasshoppers which have attained the highest development of the migrating habit. With some species as is the case with several of the well-known species of locusts in the old world, the swarms of wingless hoppers may advance over many miles of country, resulting in the spread of extensive winged swarms which may migrate hundreds of miles into new territory.

IV. Field Investigations in South Australia.

It is evident, if agriculture in South Australia is to be relieved of the losses caused by locust and grasshopper plagues, that a study must be made of the distribution, life history and habits of those species which multiply periodically into plague proportions. Records show that the plagues originate in particular areas of the country where temporary conditions favour increase in the numbers of the insects. The outbreaks are associated with soil type, vegetation and the weather in these areas, particularly rainfall.

A systematic survey has been made over a large part of the State, with the object of mapping out the distribution of the two plague species referred to above, and determining those areas in which the beginnings of plagues arise. Some notes on these surveys were given in an earlier number of this journal (Andrewartha, H. G., 1936, Vol. 39, p. 1031 and 1223). This work has been made possible by the sympathetic co-operation and generous assistance of the Council for Scientific and Industrial Research and the State Department of Agriculture. The Council for Scientific and Industrial Research has provided a motor conveyance, and the Department of Agriculture has arranged for a special grant for running expenses in connection with the surveys.

The illustration, Figure 5, shows the motor conveyance ready for setting out on a survey. It is an eight-cylinder utility truck, which has been fitted with oversize tyres (16in. x 6.50in.) and tanks for holding 20 gallons of water and 30 gallons of extra petrol. The body has been adapted to take two stretcher beds covered with a tent, and is fitted with compartments to hold stores, spare parts and other equipment. The tours which have been completed up to April, 1937, are shown in the maps, Figures 2 and 4. A search was made for the insects at intervals along the routes shown on these maps, usually about every ten miles, and notes were made on the character of the soil and vegetation; the locality was fixed by speedometer readings. Additional surveys have been carried out during 1937. Owing to the inaccessible nature of the country in the north-west of the State, this region has not been surveyed. It would not be possible to obtain adequate records from this northern pastoral area without these surveys, owing to the sparsely populated country. Individual sheep stations may be 1,000 or more square miles in area, and the carrying capacity of a large part of the country may be about 30 sheep to the square mile.

The widespread distribution of the black-tipped locust is well illustrated in Figure 2. Much of the country situated north of the 10 inch annual rainfall line is subject to irregular summer rain storms, which may be comparatively local in distribution. From the information which has been established regarding the distribution of the black-tipped locust in South Australia, it is known that small, local swarms of this species develop from time to time in this northern country. In many years in which the seasonal rains are unfavourable, the swarms do not develop into serious numbers. In certain seasons which favour its increase in numbers, swarms may develop over a wide area and form the beginnings of a potential plague. If the subsequent seasons are favourable, the insects increase in numbers and many swarms may advance southwards into the wheat belt, eventually migrating over the agricultural areas as happened in 1933-1935. The records indicate that it is only on comparatively rare occasions that extensive swarms of this species extend into the southern agricultural country. In any event, the invasion of the agricultural areas is only temporary for one or two seasons;, the climate in these southern areas normally inhibits the multiplication of the species to economic numbers.

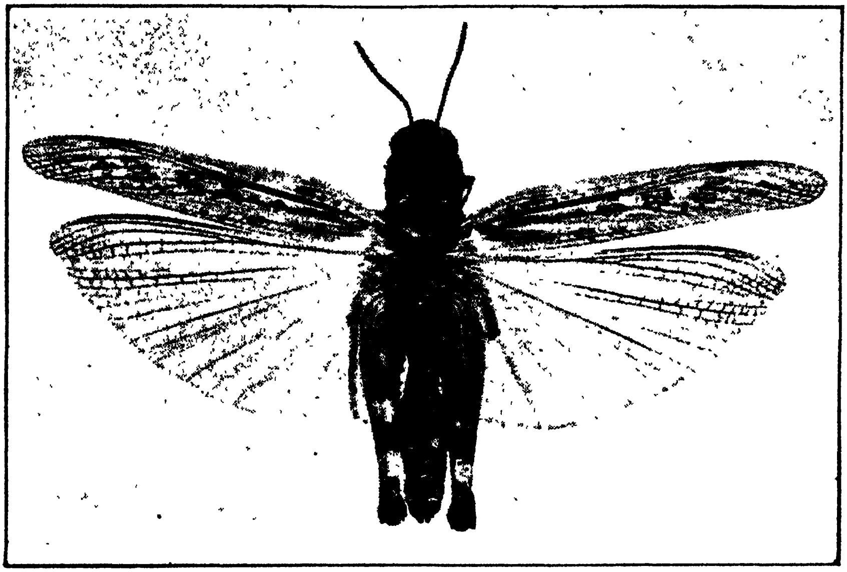


Figure 3.—The plague grasshopper (female).

The comparatively restricted area of distribution of the "plague grasshopper" is shown in Figure 4. Nevertheless this species is a problem of major economic importance in the cereal belt and adjoining pastoral country. Its main area of distribution lies in a more reliable rainfall zone than is the case with the black-tipped locust. Therefore, it multiplies into plague numbers more frequently. Records show that plague outbreaks of this species are closely associated with the rainfall of particular seasons which favour or depress its increase in numbers. The species differs markedly from the black-tipped locust, in that the insect completes only one generation in the year. The over-wintering eggs in the soil commence to hatch from about the end of August onwards, according to the district. The adults, which develop from the emerging hoppers, attain maturity from about the end of October onwards, and after egg-laying they die out. The eggs remain dormant and viable in the soil until the following spring.

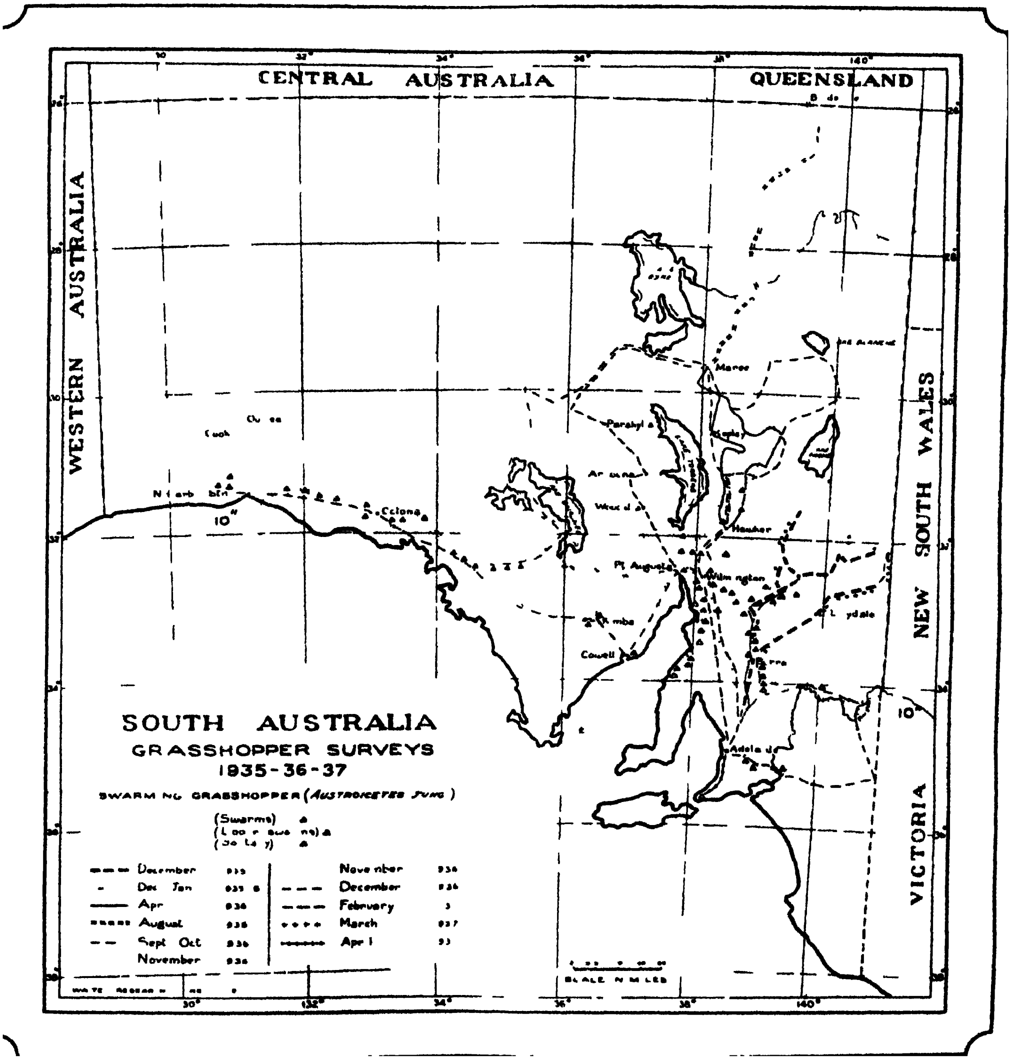


Figure 4.—Showing the distribution of the plague grasshopper in South Australia, as recorded by means of survey tours.

V. Relation of the Investigations to Control Measures.

It is evident that a study of the causes which lead to plagues of these insects must be an essential part of the investigations. Accurate information is necessary about the soil, vegetation and climate in the areas in which these plagues originate, so that we may understand how weather changes affect the mortality or survival of the insects in these areas. It appears that climate and weather play a large part in the development of a plague. This is due principally to the influence of available food in association with the effect of rainfall and temperature on the physical environment in which the insects live. If moisture and/or temperature is unfavourable, the mortality rate may be high. If they are favourable the survival rate may be high. Therefore, experiments are being carried out in the laboratory to obtain exact knowledge about the influence of dryness, wetness, and temperature on the development and behaviour of the various stages of the insect.

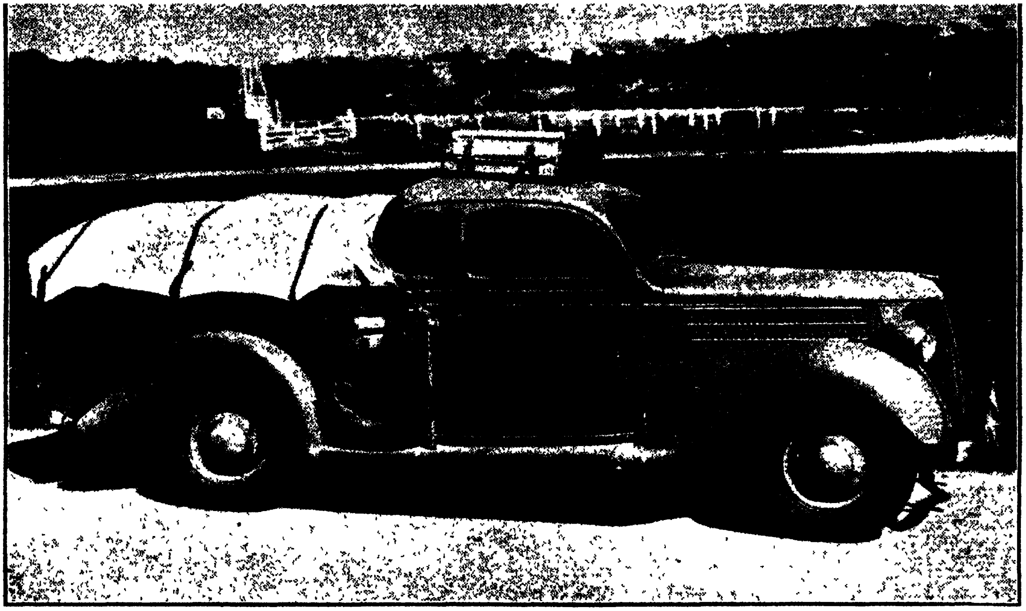


Figure 5.—Motor conveyance used for making grasshopper survey tours.

This information will enable us to understand the effect of the weather of different seasons on the progress of impending plagues. Preparations may be then made, at an early stage of an outbreak, for organisation of control measures on a co-operative basis, should the swarms advance southwards into the agricultural areas. The aim of any control campaign should be the destruction of the insects in the wingless hopper stage. Any common-sense practical methods may be employed to destroy them, but if satisfactory control is to be obtained in infested areas, it is essential that control measures should be organised on a communal basis. An account of the usual control methods adopted in different countries was given in an earlier number of this Journal (Davidson, J., 1934, Vol. 38, pp. 619-624). The information obtained by means of the investigations described above should enable us to employ more efficiently the control measures best suited to this country.

The Plough

[Paper read at the Forty-eighth Congress of the Agricultural Bureau, September, 1937.]

[T. H. Borgas, Booleroo Centre.]

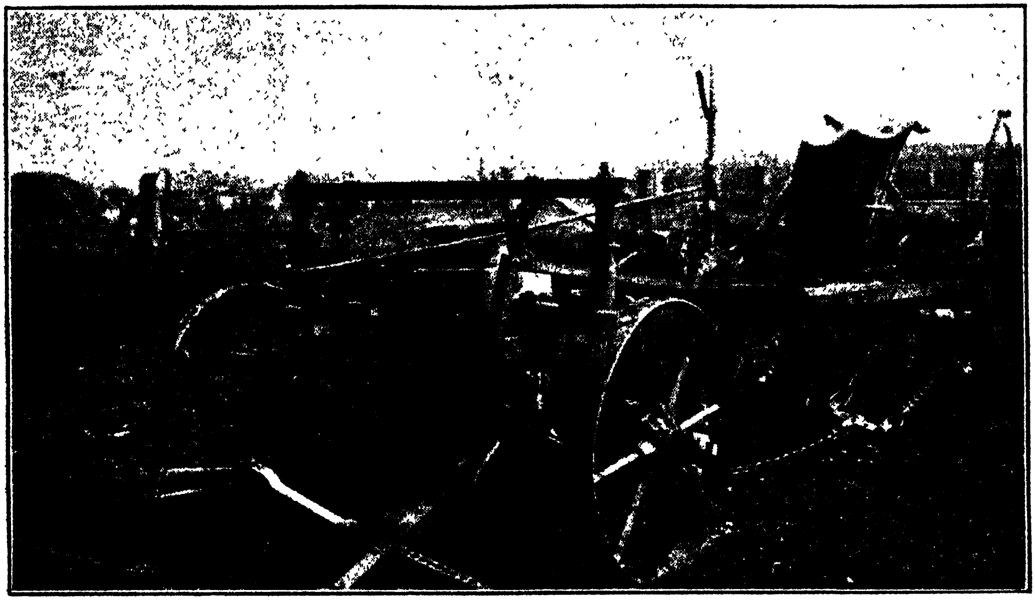
From the commencement of farming in this State, fallowing has been done mostly with the plough, which in our surer rainfall districts has, I think, come to stay. During fallowing, quite a number of older ploughs have changed hands, and new ones have been bought as a result of the tractor selling well again. As we all know, there are many different makes of ploughs on the market. When buying a new plough a number of points should be taken into consideration. Firstly, the frame should be thoroughly inspected. In my opinion, most of our prominent plough manufacturers have their frames too weak across the centre. I have many times seen ploughs which, having done very little work, strain across the centre and yet their respective owners and drivers are not aware of this until shown. This applies mostly to ploughs of five furrows and over. The main cause of this complaint is that the near-side bar of the frame runs back to the centre of the plough, whereas it should run from the frame of the near side front wheel to the frame of the near side rear wheel. The general complaint is that, as a result of this weakness the main beams of the plough will bend and come around to the near. This straining, I think, can be done in two ways—by turning too short to the near side with the plough in the ground. The other way is mainly due to the fact that it is a bridle draught, which is totally different from that of a spring released plough. On examining the bridle draught plough closely when working, it will be found that all the tension comes between the bridle and the tension arm on the "jamps". It has that tendency to pull back and front together or crumple it up, which, after all, brings all the pressure across the centre of the plough, where, I claim it is weak. Thus the frame strains to the rear. Hence my statement that ploughs are weak across the centre.

Ploughs Sagging or Going Down Across Centre.

I am pleased to note that some of our manufacturers are gradually getting behind this general complaint, as it has been quite a common one. The longer the plough so much the sooner will it sag; a fact that has always been very noticeable and more so with skim ploughs. These I have seen down to the extent of over 1in. This, in my opinion, could be successfully remedied by putting a stay along under the main frame, say a ⅝in. round iron bar with eye at both ends—it is preferable to have a post in the centre with thread and two nuts to be put through the plate at centre with a nut top and bottom so that the centre can be driven up or down easily as required. This staying with nuts at each end is not right to my idea. The former idea is very effective. I have seen it on a seven-furrow plough. I have not used it on my plough, but have used it on a 20-hoe combine frame. In fact, I could drive up the frame of a combine till it would look like a new moon. When fitting this stay on a plough it should not be put too far back, especially on a long plough, as it will have a tendency to pull the back down too far as this part of a long plough is usually pulling down of its own accord when working. The stay should also be kept up as near as possible to frame, so as not to interfere with stubble or other rubbish going through the plough.

The bridle should be slightly forward on all ploughs to get the best jumping and leverage from the plough. Modern ploughs have very good devices for the dipping or the raising of the shares. A new plough is generally set to work with new shares and works very well until the gripping edge is gone, or perhaps the ground is getting hard and the plough rises and slips over the surface. At this stage the feet should be given a little more dip.

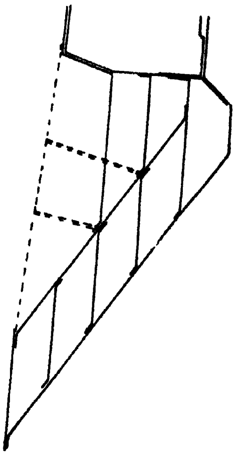
The Plough—*continued.*



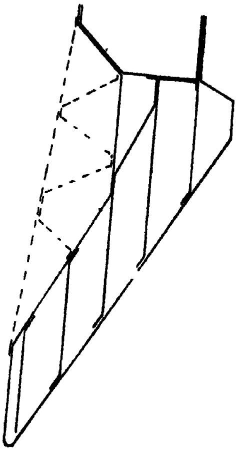
Plough, 5 years old, showing the combined horse and hand steering fitted to a plough with typical modern steering.

Plough with combined horse and hand steering.

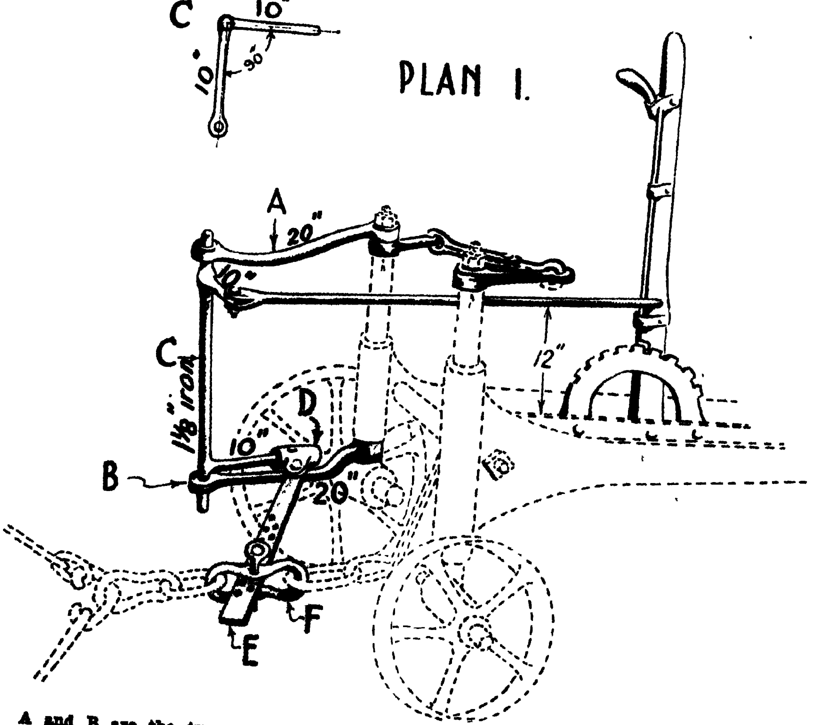
The Plough—*continued.*



Plough frame No. 1.



Plough frame No. 2.



A and B are the two supporting arms of C, which have eyes or holes on front ends, so that C can turn in them.

C is the apparatus which fits into the holes of A and B, and turn in the holes, with top arm connected to steering lever and bottom arm connected direct to chain pull of horses, thus making it both horse and hand steering. The two arms, top and bottom, 10in. long are at right angles.

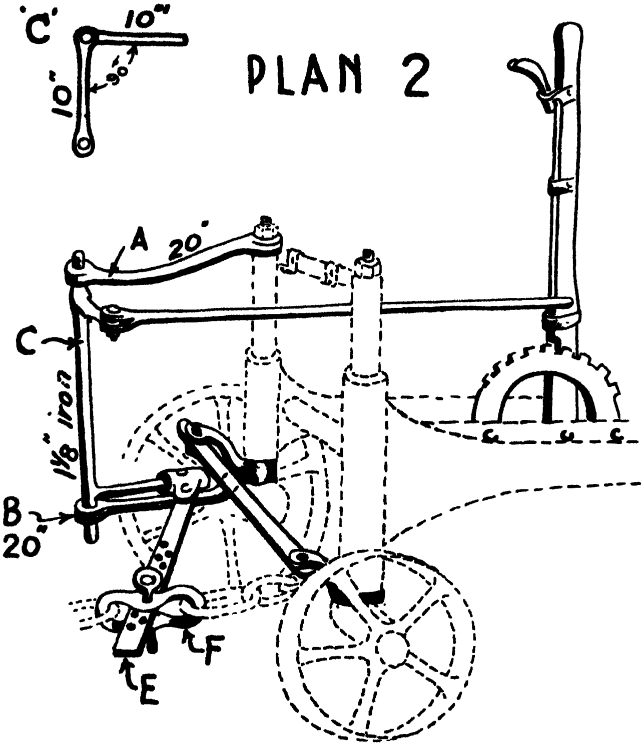
D is the connection of regulating plate E and bottom arm of C, and should be as short as possible.

E is the regulating bar, and fits into connection D, and also goes through link F.

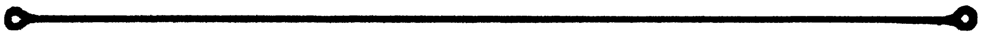
F is the link that bar E goes through in the pin shown. When the main draught chain is tight the pin in link F should be about square across from the hole in support B.

The Plough—*continued.*

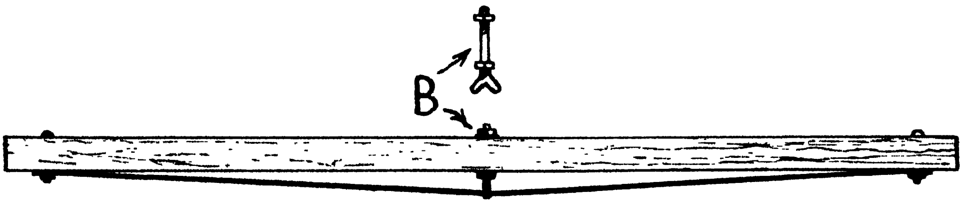
PLAN 2



A

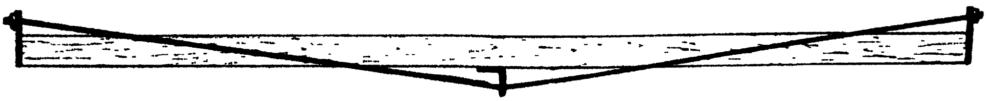


C



METHOD 1

D



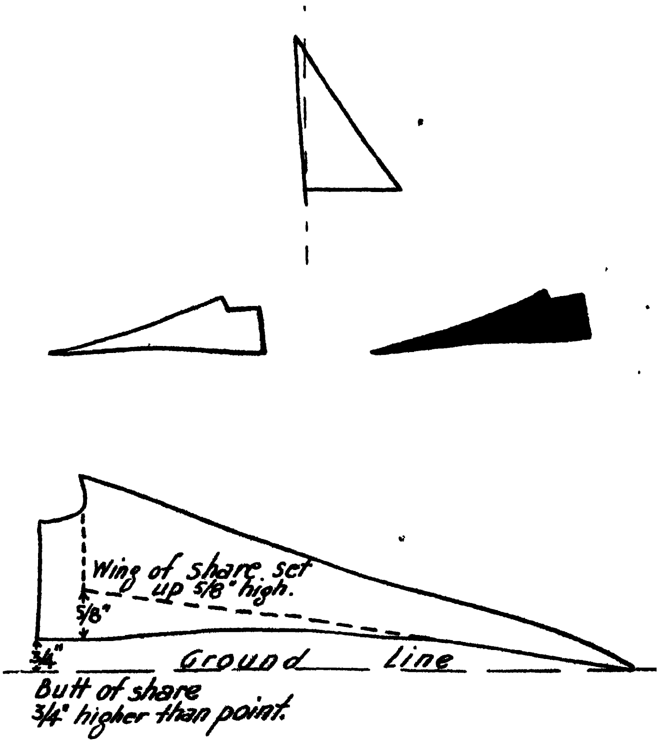
METHOD 2

A—Iron bar with eye on each end (side view), used in Fig. C.
B—Iron post with nuts, shown on Fig. C. Note the fork-like appearance, which fits around bar A in centre of C.
C—Beam complete, with A and B attached, showing correct way of staying-up any wide or long implements or beams.
D—The incorrect way, usually used on practically all drills and combines.

The Plough—*continued.*

When a plough is made the shares should be given about an inch dip, that is to say, with a new cast share the point should be 1in. lower than the back of the share and the mouldboard kept down to this pitch. Smithys tell me that ⅝in. dip is the usual thing. I am positively sure, however, that this is not enough in our part of the country and with such little dip as this they set their mouldboard, and when given more dip it brings the mouldboard too far out of the ground. This means that, when ploughing shallow, all of the grass will not be turned. The wing of a share should be set from ¼in. to ⅝in. higher than back of share.

Many people argue in favour of a heavy plough, but I prefer a light plough properly set, providing conditions are not too rough. Another common complaint is that ploughs do not follow the horses as they should; this is not so noticeable with the tractors. I have successfully remedied this by heating the front feet or bodies and bringing the share point a little more to the near front share ¼in. and then less according to the number of furrows to the centre of the plough where the share should be straight. Then, from centre to the back of plough they should be brought gradually the other way to the off, having the back foot nearly ¼in. in to the off. This keeps the back of the plough from running wide and gives the front that little bit of grip which helps to keep a full cut. This job requires care and understanding. Having done this, and having a steering gear such as I have, it is a pleasure to drive a plough as one always has a full cut and without pulling the horses about. This is horse and hand steering combined and the result is nice square corners and no pig troughs. Every plough should have a separate lever to raise the front or at least off-side front of plough, as nearly every working plough has its front foot strained under. This generally happens when turning too short "gee-off-round" and not having the plough sufficiently raised in front. With a foot strained under


Wing of share set up 5/8" high.
5/8"
3/4"
Ground line
Butt of share 3/4" higher than point.

Plough share diagrams.

The Plough—*continued.*

a plough will not do even work. Also too much care cannot be exercised in the toes of a plough. They should never scrape on the ground or metal roads when being shifted about, as nothing is more annoying than to have the share kicked off at every little rut when working and the plough not doing even work. A worn foot will allow the point of a new share to go down and when the gripping edge of the share is gone it allows it to come up and it also causes uneven work. If the toes are worn, no expert can set it to work efficiently. It is always well to remember it costs more to do up one toe than to buy 20 shares.

The off-side rear wheel should run between two furrows and not on a furrow, as running between the furrows gives the work a much better appearance. Not only does it do that, but when crossing later with other implements it is not so rough.

The wrack also should be big on all ploughs thus giving more notches and not altering the depth of the implement so much per notch.

Seed Wheat from Crop Competitions, 1937-38

In Wheat Crop Competitions conducted in the under-mentioned districts the following Competitors exhibited crops which, in the opinion of the Judge at the time of inspection, should produce grain suitable for seed purposes.

WAY.

Competitor and Address. Varieties.

Messrs. Gaden & Linke, Koonibba—Early Gluyas.
E. W. Bolace, Charra—Quality, Gluford.
Messrs. Hazledine & Sons, Charra—Early Gluyas.
M. Martin, Maltee—Quality.

BUXTON.

Lienert Bros., Buckleboo—Nabawa, Dundee.

ALFRED.

P. Paul, Alawoona—Gluyas, Dundee, Ranee 4H.
Moorook Farming and Grazing Company (C. S. Goldsworthy and E. A. Voight), New Residence—Waratah.
R. O. Voigt, New Residence—Dundee.
W. A. Thiel, Taldra—Ranee 4H.
A. Stirling, Malpas—Ranee 4H.
A. W. Traeger, Loxton—Baringa.
W. Paul & Sons, Alawoona—Sword.
A. C. Reichstein, Paruna—Silver Bart.
A. C. Webb, Paruna—Sword, Ford, Dundee, Baringa.
E. M. Edwards, Paruna—Ranee 4H.
Auricht Bros., Taldra, Ranee 4H, Sword.
A. E. Obst, Taldra—Baringa, Sultan, Nabawa.
G. E. Hyde, Paruna—Ranee 4H, Nabawa.
B. Sackse, New Residence—Bencubbin.
A. G. Petch, Meribah—Ranee 4H.
G. J. Zimmermann, Meribah—Baringa, Nabawa.
L. G. J. Cummings, Paruna—Merridin.

SOUTHERN YORKE PENINSULA.

L. Boundy, Minlaton—Waratah.
E. H. Giles & Son, Yorketown—Baringa.

NORTHERN YORKE PENINSULA.

O. D. Jericho, Arthurton—Ford.
R. S. Bussenschutt, Paskeville—Ford.

FLINDERS.

H. O. Clements, Yeelanna—Waratah.
W. H. Watkins, Yeelanna—Ford.
R. R. Wilson, Yeelanna—Improved Ford.

BALAKLAVA.

Competitor and Address. Varieties.

C. S. Shackley, Owen—Sword.
Harkness Bros., Owen—Ford.
G. O. Uppill, Balaklava—Sword.
J. D. Campbell, Barabba—Sword.
C. W. Mundy, Barabba—Ford.
D. J. Wilson, Stockyard Creek—Nawab.
F. D. Lake, Owen—Sword.
A. S. Evans, Owen—Sword, Bencubbin.
Sorrell Bros., Barabba—Sword, Ford.
H. Bradley, Owen—Sword, Ford.
Bowyer Bros., Owen—Sword.
M. Brady, Mallala—Sword.
F. E. Franks, Mallala—Sword.
A. G. Roberts, Mallala—Gluyas.
Baker Bros., Woods—Nabawa.

ROBINSON.

J. & F. Cash, Syringa—Late Gluyas.
J. A. Dodgson, Collie—Bencubbin.
D. Hood, Collie—Totadgin.
J. J. Murphy, Mount Hall—Late Gluyas.
P. J. Murphy, Mount Hall, Late Gluyas.
M. Smith, Collie—Bencubbin.

ALBERT.

C. H. Grieger, Nildottie—Bencubbin.
F. W. Horstmann, Netherleigh—Bencubbin.
J. W. G. Mann, Mindarie—Dundee, Baringa.
A. E. Carslake, Kunlara—Ranee 4H.
W. H. Todd, Caliph—Baringa.
T. M. G. Vowles, Wanbi—Ranee 4H, Dundee.

MID-YORKE PENINSULA.

O. H. Heinrich, South Kilkerran—Ford.

RUSSELL AND BUCCLEUCH.

A. Y. Knight, Borrika—Sword.
R. S. Saunders, Yurgo—Sword.
M. C. Rogers, Yurgo—Sword.
G. R. Tregilgas, Yurgo—Baringa.
Mrs. M. H. Hopgood, Yurgo—Sword.

SEED WHEAT FROM CROP COMPETITIONS—*continued.*

WESTERN.

Competitor and Address. Varieties.
R. P. Noble, Port Pirie—Nabawa.
L. C. Crouch, Wandearah East—Ford.

JERVOIS.

A. Spriggs, Cleve—Ford, Ranee 4H.

CENTRAL.

W. K. Oliver, Wasleys—Sword.
M. H. Richter, Reeve's Plains—Sword.
L. W. George, Wasleys—Sword.
P. J. Shanahan, Freeling—Sword.
W. H. Lawes, Sandy Creek—Ford.
A. M. Dawkins, Angle Vale—Dundee.
A. W. Roediger, Gawler—Ford.
H. J. Griffiths, Salisbury—Dundee.

SOUTHERN.

Rankine Bros., Strathalbyn—Baringa.
R. J. & J. Mitchelmore, Strathalbyn—Baringa.
E. E. Liebelt, Monarto South—Sword.
C. F. Altmann, Monarto South—Sword.
M. & E. Thomas, Monarto South—Sword.
H. Paech, Rockleigh—Dundee.
A. R. Strauss, Monarto South—Baringa.
S. Wachtel, Palmer—Bobin.
H. H. Krause, Palmer—Dundee.
S. Bretag, Mannum, Nabawa.
Wachtel Bros., Palmer—Dundee.
J. O. Bottroff, Palmer—Dundee.
E. O. Paech, Palmer—Sword.

TATIARA.

J. E. K. Ridgway, Wolseley—Dundee.
E. W. Sharrad, Wolseley—Dundee.
Fisher Bros., Bordertown—Dundee, Ghurka.
E. J. Buckley, Bordertown—Dundee, Ghurka.
H. C. M. Pilgrim, Wolseley—Dundee.
J. B. Smith, Bordertown—Dundee.
L. Y. Langdon, Bordertown—Ranee.
Tilley Bros., Bordertown—Dundee.

CHANDOS.

L. J. T. Foale, Parilla—Ranee 4H.
F. A. Maegher, Pinnaroo—Sepoy.
G. E. Harding, Parilla—Bobin.
F. H. Whittlesea, Jabuk—Bencubbin.
A. J. Beelitz, Parrakie—Baringa.
R. C. Kerley, Parilla—Bobin, Bena, Ranee 4H.
R. M. Neindorf, Parilla—Bobin.
W. J. Ross, Parrakie—Dundee.
E. S. Ross, Parrakie—Sword.
Przibilla Bros., Parrakie—Silver Bart.
P. S. Tonkin, Lameroo—Ranee 4H.
A. J. A. Koch, Lameroo—Bencubbin.
Foale & Sons, Parilla—Ranee 4H.
C. W. Lehmann, Lameroo—Sword.

FAR NORTHERN.

E. H. Hampel, Terka—Dundee, Ranee 4H.
J. M. Modystach, Wilmington—Dundee.
F. T. Orrock, Wepowie—Sword, Dundee, Ranee 4H.
J. F. W. Orrock, Wepowie—Ranee 4H.
I. G. Schulz, Terka—Baringa, Dundee, Sword.
H. G. Kupke, Morchard—Ranee 4H.
Gregurke & Burns, Wepowie—Merridin.
B. S. McCallum, Morchard—Ranee 4H.
E. H. Schulz, Terka—Sword.
W. G. Gregurke, Wepowie—Felix, Dundee.
D. G. George, Wilmington—Sword.
J. F. W. Roocke, Wepowie—Ranee 4H.

MID NORTH.

Competitor and Address. Varieties.
H. A. Zweck, Hart—Ford.
A. S. Kirk, Merriton—Ford.
Spencer Bros., Koolunga—Felix.
J. L. Howard, Yacka—Ford.
F. J. Pedler, Koolunga—Bencubbin.
W. P. R. Simon, Halbury—Sword.
M. Smart & Son, Gulnare—Sword, Bencubbin.
J. L. Noonan, Gulnare—Bencubbin, Sword.
E. E. Richards, Narridy—Sword.
E. H. Bentley, Koolunga—S.H.J.
A. Maitland, Rochester—Nabawa, Ranee 4H.
E. H. Ottens, Brinkworth—Bencubbin.
E. D. Whitehorn, Koolunga—Dundee.
E. E. Lang, Georgetown—Nabawa.

NORTHERN.

J. Rucioch, Laura—Baringa.
J. C. Kleinig, Laura—Dundee.
B. B. Moy, Jamestown—Nabawa.
J. W. Prior, Gladstone—Ranee 4H.
Amey Bros., Caltowie—Bencubbin.
Smith Bros., Laura, Baringa, Dundee.
Blieschke Bros., Melrose—Baringa.
H. R. Lines, Laura—Sword.
N. W. Royal, Caltowie—Bencubbin.
J. R. Deer, Wirrabara—Dundee, Baringa.
J. A. Halse, Beetaloo Valley—Bencubbin.
J. E. Lehmann, Caltowie—Bencubbin.

LE HUNTE.

H. Broad, Condada—Ford, Bencubbin.
W. M. Heath, Pygery—Totadgin.
S. C. Billinghurst, Minnipa—Totadgin, Ford, Nabawa, Sword, Sultan, Merridin.
A. J. Shepherd, Wudinna—Bencubbin.
G. P. Symons, Pygery—Nabawa.
J. F. Kammerman, Pygery—Bencubbin.
P. T. Cook, Mount Damper—King's White.

MIDLANDS.

E. V. H. Wilsdon, Andrews—Dundee.
P. McD. Smyth, Salters Springs—Sword, Marathon.
A. E. Crossing, Farrell's Flat—Dundee.
J. Miller, Farrell's Flat—Dundee.
W. R. and J. E. Jones, Auburn—Ghurka, Waratah.
F. Coleman & Sons, Saddleworth—Waratah, Dundee.
A. R. Bagshaw, Saddleworth—Dundee.
P. V. Browne, Auburn—Dundee.
E. J. Williams, Tothill's Creek—Ranee 4H.
L. Harvey, Hilltown—Dundee.
J. H. Torr, Farrell's Flat—Mogul.
H. Michael, Hilltown—Dan.
B. Behn, Riverton—Dundee.
L. Martin, Farrell's Flat—Dundee.
R. F. Thomas, Hallett—Dundee.

OATS.

A. H. Allen, Wandilo, Mount Gambier—Algerian.
C. B. Mitchell, Mount Gambier—Algerian.
C. Thompson, Mount Gambier—Algerian.

BARLEY.

A. H. Allen, Wandilo, Mount Gambier—Plumage Archer.
H. G. Norman, Mount Gambier—Plumage Archer.
W. L. Burrows, Mount Gambier—Plumage Archer.
C. B. Mitchell, Mount Gambier—Plumage Archer.

Wireless Talks

The Value of Seed Testing

By Edgar W. Pritchard, Agricultural Botanist. Talk broadcast through Station 5CK on 29th November, 1937.

The seed is the beginning of every crop. In it is contained, in some mysterious way [or "by some mysterious means"], the potentiality of the final product. What the harvest will be depends more on the seed than on any other single factor in the whole process of the cultivation of the soil.

And yet up to about 20 years ago very little attention was paid in any systematic way to the quality and condition of the seed before it was put into the ground. During that 20 years, however, the science of seed testing has been rapidly built up, until to-day it is almost as exact and reliable as the chemical analysis of soils and fertilisers.

The object of seed testing is to ensure that the crop starts off with everything possible in its favour. And to ensure this, there are quite a number of points which must be attended to.

Good seed for planting should be free from weed seeds. It is a well-known fact that most weeds are spread to new localities by means of crop seeds. There are about 300 foreign weeds growing in South Australia. Of these a few, such as Sour Sobs and Cape Tulip, were introduced as garden plants; but the great majority came in surreptitiously, mixed with various farm and garden seeds. After gaining admission and establishing themselves, they were spread to new districts to some extent by travelling stock. This is true chiefly with plants having burr-like seeds, by which they can cling to the coats of animals. But they have been distributed over the countryside much more by means of crop seeds, which have been bought from the seedsmen, or by the exchange of seeds among farmers. Indeed, this process seems to be so inevitable and so regular, that it is possible to judge fairly closely the time that a district has been settled simply by the number of weeds which it supports.

If seed testing and inspection had been in vogue in Australia from the beginning of colonisation, nearly all of this weed problem, with its tremendous annual losses, could have been avoided.

The detection and estimation of weed seeds in a sample is part of the purity test of crop seeds. The weed seeds are indentified and counted, and the number per ounce or per pound thus estimated.

The second part of the purity test has to do with insects—mites, weevils, grubs, etc. These are usually killed by subjecting the whole parcel to fumigation.

The third part of the purity test consists of estimating the amount of dirt, chaff, stones, and any other foreign matter. This is necessary, because all these foreign ingredients reduce the number of seeds and, therefore, the number of plants, which will be produced by a certain weight of the sample. But besides this, dirt often carries the spores of fungus diseases. Also it sometimes contains the eggs of insects. This is the case with the lucerne flea. All these impurities are weighed, and the amount of pure seed contained in the sample calculated.

Next comes the germination test. This is intended to show whether the seed is fresh and will produce strong, vigorous seedlings. The conditions of the test are, therefore, arranged to imitate, as far as possible, the very best natural conditions of crop sowing on the farm or the garden. One hundred seeds are set out on moist cloth or blotting paper, and placed in a cupboard where conditions of moisture and heat are carefully regulated. As the seeds sprout, they are counted off at regular intervals. Each kind of seed has its own particular condition of moisture and temperature at which it gives the best results, while the time required to finish the test also varies with each variety.

And lastly comes what is called "real value." This is ascertained by multiplying the percentage of purity by the percentage of germination, and dividing by 100. It represents the number of pounds of pure seed that will sprout in 100lbs. of the sample. Thus, if there is in a sample 5 per cent. of total impurities giving a purity of 95 per cent., and the germination test gives 80 per cent. of sprouts, then the real value will be 95 × 80 ÷ 100, which is 76 per cent. Thus, when a farmer buys 100lbs. of such a sample of seed, he will know that he is getting just 76lbs. of seed which will grow under the best conditions.

In some cases, seeds are bought and sold solely on this basis. In New Zealand, for instance, Papsalum seed will be priced at, say, 1s. 6d. per pound for an 80 per cent. real value, and 1s. 4d. per pound for a 70 per cent. real value.

Such is the process of seed valuation through what is called seed testing or seed analysis. Although the science of seed testing is only some 20 years old, there are Seed Testing Stations, properly equipped with special apparatus and trained staffs, in all the civilised countries of the world. There are many such in Europe and America, one in New Zealand, and one in each of the States of Australia. The work of the Australian stations falls into three divisions.

The first has to do with the testing of seeds which are being imported into Australia from overseas. All packets above 1lb. in weight are sampled at the port of entry, and the sample tested for purity and germination, while the parcel is held in quarantine. This is to ensure, firstly, that no more weeds shall enter the country, and secondly, that the seed is new and fresh, and of good germinating quality. If it does not come up to standard in these two respects, it must be destroyed or returned to the country from which it came.

The second function of our Seed Testing Stations is to provide a seed testing service for primary producers and merchants. Thus farmers and gardeners, free of charge, and seed merchants for a small fee, can have any sample of seed tested and evaluated. Through this means, each knows exactly the kind of material he is dealing with, and can thus sow or sell with confidence.

And the third function is to ensure that the supply of seed on the local market is of good quality, both from the points of view of purity and germination. Although the seed may be good when it arrives in the country, it may be kept so long before being sold that it will lose most of its germinating power; or it may be bought from a farmer in an old district and sold to a farmer in a new, clean district, and thus be the means of spreading weed seeds far and wide. Pure Seeds Acts in other States of the Commonwealth enable the authorities to buy samples of seeds on the local market and to submit them to an analysis, and certain penalties are provided where seeds do not come up to a specified standard.

In South Australia primary producers may have any sample of seed analysed free of cost by sending a small representative packet to the Department of Agriculture.

Tobacco Processing

By R. E. Courthope-Giles. Talk broadcast through Station 5CK on 6th December, 1937.

This talk was given with the object of assisting those engaged in the production of flue-cured tobacco to obtain better prices for their leaf by improving their methods of handling the cured product.

Providing that soil and climatic conditions are suitable, no difficulty should be experienced in the curing of tobacco leaf in from four to six days, that is, from the filling of the barn until drying out has been completed.

If proper care has been taken during the stringing process—prior to curing—unripe, badly damaged, and short leaf under 9in. in length will have been discarded as it does not pay to handle this class of product. The cured leaf hanging in the barn should present a uniform appearance.

Unfortunately, owing to the lack of proper facilities and bad handling, good crops of well-cured leaf are not giving the financial returns that they should in many cases. Tobacco growing is still in its infancy, and but few producers are as yet sufficiently well established to provide the necessary buildings and plant.

By means of co-operation tobacco growers could greatly improve their position. The industry has been pioneered principally by small farmers who, owing to their slender resources, are compelled to sell their cured leaf at the earliest possible moment. Leaf is being sold to manufacturers in an immature state and, thus, the producer sacrifices quality to obtain a speedy return. Manufacturers are purchasing and re-drying leaf that has been insufficiently bulked to have matured in any way, and by re-drying, which from their point of view of storage is essential, has no opportunity of going through the natural sweats that alone can eliminate the harshness and unpleasant characteristics of immature tobaccos. In other recognised tobacco-producing countries this difficulty has been overcome by the organised action of growers who sell their leaf to co-operative societies which pay out a 50 per cent. advance upon delivery of standard grades at their warehouse, and which holds and sells the leaf to the best advantage, when in marketable condition. Most of the Empire-grown tobaccos are disposed of in this way. In the United States the majority of the leaf is sold to warehousemen who come between the producer and the manufacturer, and who can be relied upon for the type of leaf which they handle and the uniform standard of their grades, upon which the established blends depend.

South Australian growers are considering the establishment of co-operative grading sheds, to provide uniformity in grading and improvement in general get-up of their produce. This move should prove of great assistance to manufacturers who, up to the present, have had to send their buyers to each producer's property to make their purchases, a most lengthy and expensive business. Tobacco has been offered for sale under most unfavourable conditions, and the present move by growers should prove to be highly beneficial to their interests. The Adelaide Hills Tobacco Growers' Association has the matter of grading sheds in hand, and should consider the extension of their co-operative movement to that of warehousing by which is meant the holding and rendering of leaf until it reaches true marketable condition. With the introduction of the advance system, the necessity for speedy sales could be overcome, and leaf could be held for the few months of spring weather to enable the necessary maturation process to take place. Manufacturers holding huge stocks of tobacco cannot be expected to bulk the leaf, and it should not be offered to them until it is in a condition comparable with that of imported tobaccos. Growers are not making the best of their leaf, and manufacturers are perhaps not as favourably impressed with the smoking qualities of Australian leaf as they certainly would be if it was properly handled and matured before placing upon the market.

Apart from these co-operative movements there is room for a vast amount of improvement in the method of handling the cured leaf upon the farms. The provision of adequate storage space and handling facilities are just as necessary as the actual curing barn. Curing ripe tobacco produced under the right conditions is the most simple and speedy of the operations entailed in the process of turning leaf from the plant into a palatable smoke. Growers must bear in mind the fact that no single leaf will ever provide the perfect manufactured cigarette or pipe tobacco. The secret of success in that phase of the industry lies in the blending of various types of tobacco, each with some desirable characteristic, flavour, aroma, mildness or strength, burning qualities or other feature that make it suitable for some particular form of manufacture. All tastes have to be catered for.

To obtain the best results growers must from first to last handle their leaf with great care to prevent breakage. Broken leaf is most costly for the manufacturer to handle, and in consequence it brings reduced prices as against sound leaf of an otherwise similar class. At the completion of the curing and drying process, the leaf, being practically devoid of all moisture, is extremely brittle, and should not be touched until it has taken up sufficient to render it pliable or "tough" as it is termed. To obtain the requisite condition, when atmospheric humidity is low, and the opening of ventilators and watering of the barn floor are insufficient, steam should be applied. High pressure is not desirable, the moisture only being required to obtain that tough condition. The majority of growers use old 44-gall. petrol drums as steamers to obtain the necessary humidity during the colouring part of the curing process, and can utilise them in the same way to condition the leaf before emptying and unstringing their tobacco. An old boiler, however, is of inestimable value to a grower, as it can be used in so many ways during the processing of a crop.

Although steam will greatly facilitate the emptying of a barn by enabling the grower to remove the sticks of strung tobacco from the racks, it must be emphasised that natural moisture must be taken up by the leaf before it is bulked for maturation purposes. The effect of toughening obtained by steam so readily, is as speedily lost, and leaf bulked straight from steaming will not improve, but will dry out with great rapidity.

Upon removal from the curing barn, the sticks of cured tobacco should be hung in a conditioning cellar or shed capable of accommodating a full barn of tobacco. Where cheap labour is obtainable, a cellar is generally dug and fitted with racks at 2ft. 6in., 4ft. 6in., and 6ft. 6in. from floor level to facilitate handling in loading and unloading the racks of tobacco. In Australia the shed method of construction will probably prove to be the cheaper. A shed with an iron roof, perforated guttering around it and hessian sides, worked with an overhead water supply similar in principle to the ordinary bush-made cool safe proves most effective. By either means leaf will rapidly attain the correct condition, and is then ready for unstringing. Remove the sticks of leaf to the bulking shed, which should be a well-constructed building with a wooden floor well above ground level and with south lighting. As the leaf is removed from the sticks it should be rough graded into four classes: dark, mahogany, bright, and anything still containing traces of green and which all require separate bulking.

The various classes of tobacco should be bulked separately to simplify the final grading, and to control the amount of moisture necessary to obtain the best results during the sweating processes. The amount of moisture when put down will vary from 12° to 18° according to class, but on no account should be exceeded unless the bulks are under constant supervision and temperatures can be taken at regular intervals to prevent overheating and a funky or mouldy condition setting up at 111° F. Good bulking will produce uniformity of colour and appearance generally, apart from the marked improvement in smoking quality obtained. Nothing should be left to chance if any movement is taking place.

To expedite matters during the winter months, a hot pipe around the inside of the bulk stores will prove a valuable asset in maintaining temperatures.

Bright leaf bulks should be built up with hollow centres to enable the tips to dry out and to prevent possible darkening, as excess moisture taken up through the bulks is liable to accumulate at this point and cause serious discolouration. When breaking down these bulks, however, it is advisable to put a steam jet inside the bulk for a few minutes to prevent damage to tips which are as a rule extremely brittle. Bulks containing green traces, but not immature leaf, and which to the experienced eye is easily distinguished, require special treatment. Circular hollow bulks give the best results, and roughly a "three pound to one" pressure should be applied. With a high moisture content and under such pressure this leaf must be kept under observation, otherwise black rot will set up. Under no consideration should immature leaf be so treated, as trained buyers can easily detect and will certainly reject any such leaf offered for sale. Immature and inferior leaf does not pay to handle.

When the bulks are ready for final grading they should be treated separately, great care being exercised to prevent breakage. Steam them if necessary, but never handle in too dry a condition. If grading is to be done to the best advantage, good benches must be provided for those undertaking the work, with proper partitions at the back for the various classes of leaf. A south light is essential if the true colour of the leaf is to be distinguished, and under no consideration should the grading be attempted in sun or artificial light. The necessary humidity for the grading process can again be provided by means of steam jets operating in close proximity to the benches. The various grades of leaf must be tied into neat hands by means of tie leaves of similar quality to that being handed up. It will then probably be necessary to stick the leaf and run it through a drying room, equipped with a hot pipe where excess moisture can be taken off. High condition will cause serious trouble, either discolouration or mildew. The leaf having been graded for colour, length, and soundness, it should be baled accordingly and contain one true class only, each bale containing not more than 180lbs. of leaf, with a moisture content of not more than 14%. Baling presses should be fitted with false wooden tops and bottoms which can be held together with angle iron clips, so that when bales have been compressed to the right dimensions, 36in. x 22in. x 18in., they can be removed from the press to enable baling to continue and yet remain under pressure and keep their shape while being sewn into their 14-oz. hessian coverings. It will greatly improve the appearance of bales if they are left under pressure for some hours, they retain their shape while in transit to the factories, and present a workmanlike appearance. Upon completion of the baling operations, the bales should be stored in a dry place and not stacked one upon the other while awaiting the advent of the buyers. Even when laid out singly, bales should be turned at least once a week to keep them in proper condition and prevent them from losing their shape.

In conclusion I should like to emphasise once more the desirability of co-operation among tobacco growers, for the purpose of pooling experience, overcoming their difficulties and generally improving their conditions. Growers must recognise the necessity for their leaf being in sound and merchantable condition before offering it for sale. It is the bounden duty of growers organisations to oppose and if possible prevent the sale of immature and inferior leaf, if the industry is to be established upon sound lines, and delay the sale of sound leaf until it is in mature and marketable condition. Such action requires sound organisation, but will ensure the greatest possible return to producers and give greater satisfaction to manufacturers and the ultimate consumers.

Parafield Egg-Laying Competition, 1936-37

Review of the Competition for the Month of December, 1937

[By C. F. Anderson (Chief Poultry Adviser and A. Clifton (Competition Attendant).]

Although the weather has been favourable for good production, the lay for the month of December was not as good as was expected. There was a decrease of 7 per cent. on the production for November, the percentage being 51.28 for December, 1937, as compared with 58.5 per cent. for November, 1937, and 54.5 per cent. for December, 1936.

Among the leading birds there is a continuance of good laying, the leading bird being particularly consistent. This bird—a Rhode Island Red, entered in the Home Project Section—was the first one to lay 200 first grade eggs in the competition. She laid the 200th egg on the 15th December, and at the end of that month had a score of 211 first grade eggs. The only other bird to reach the 200 mark during December was a White Leghorn also entered in the Home Project Section. The Black Orpington entered by Mr. V. F. Gameau in the Soaked Grain Section laid particularly well during the first half of the month, but after a sequence of 14 first grade eggs in 14 days—nearly all of these eggs being 2¼oz. in weight—she again went broody.

Four deaths were recorded this month. One was in the leading team of Black Orpingtons owned by Mr. C. A. Maxwell, and another in the team owned by Mr. H. J. Mills, which was in second position.

An outstanding feature for the month was the very satisfactory percentage of first grade eggs recorded, 80.2 per cent. being the full 2oz. in weight or over. This is only 2 per cent. less than for November.

Feeding Tests at Parafield Poultry Station.

A new series of feeding tests was commenced at Parafield Poultry Station on the 1st April, 1937. Five tests have been arranged each of 50 White Leghorn pullets. The principal object of these tests is to collect some accurate data concerning the results obtained from the soaked grain method of feeding in different ways, also the production of the birds under the various methods of feeding. The following is a list of the tests that have been arranged:—

A. Morning—Soaked wheat at rate of 8lbs. grain per 100 birds, meat meal ½lb. per 100 birds, greenfeed same quantity as dry grain. Afternoon—Same as morning, but meat meal ¼lb. per 100 birds.

B. Morning—Soaked wheat at rate of 8lbs. per 100 birds, ¼lb. meat meal per 100 birds, ¼lb. linseed meal per 100 birds. greenfeed same as No. 1 test. Afternoon—Same as morning, but without the ¼lb. linseed meal.

C. Morning—Soaked wheat once a day at rate of 8lbs. per 100 birds, meat meal ¾lb. per 100 birds. Afternoon—Dry wheat at rate of 1¼ozs. per bird.

D. Morning—Soaked barley twice a day at rate of 8lbs. per 100 birds, greenfeed same quantity as dry grain, meat meal ¼lb. per 100 birds. Afternoon—Greenfeed same quantity as dry grain, meat meal ¼lb. per 100 birds.

E. Morning—Soaked wheat and barley at rate of 4lbs. wheat and 4lbs. barley per 100 birds, greenfeed same bulk as dry grain, meat meal ½lb. per 100 birds, linseed meal ¼lb. per 100 birds. Afternoon—Dry grain at rate of ¾oz. wheat per bird and ¾oz. barley per bird.

The quantity of food as stated in the test will vary from time to time according to the requirements of the birds. The quantities stated in the tests are given as a basis, but are also liable to alteration according to the requirements of the stock.

Test.	No. Eggs Laid from 1st April, 1937, to 30th Nov., 1937.	No. Eggs Laid, December, 1937.	Total Eggs Laid from 1st April, 1937, to 31st Dec., 1937.
A	5,251	565	5,819
B	5,019	592	5,641
C	4,883	542	5,425
D	4,529	696	5,225
E	4,747	557	5,304

	Value of Eggs.						Cost of Food.						Return Above Cost of Food, December, 1937.			Total Return Above Cost of Food, 1st April to 31st Dec., 1937.		
	1st April to 30th November, 1937.			December, 1937.			1st April to 30th November, 1937.			December, 1937.								
	£	s.	d.	£	s.	d.	£	s.	d.	£	s.	d.	£	s.	d.	£	s.	d.
A	25	0	8	2	7	7	9	0	5	0	19	7	1	8	0	17	8	3
B	23	13	11	2	9	10	8	17	11	0	19	2	1	10	8	16	6	8
C	23	2	2	2	5	8	8	19	8	0	19	4	1	6	4	15	8	10
D	20	14	9	2	18	7	9	5	6	1	4	2	1	14	5	13	3	8
E	21	19	4	2	6	11	9	2	0	1	1	2	1	5	9	14	3	1

Meat Exports.

Meat exports (figures taken from statistics supplied by the Australian Meat Board)-

	Total Australian Exports, July-November, 1937.	
	Carcasses.	
Mutton	224,626	(S. Aus., 44)
Lamb	2,468,096	(S. Aus., 306,364)
Pigs (porkers and baconers)	87,361	(S. Aus., 2,641)
	Cwts.	
Chilled beef	235,870	(S. Aus., nil)
Frozen beef and veal	1,106,563	(S. Aus., 1,587)

Herd Testing Results

The Supplement in the December, 1937, Issue contains a record of:—

1. **Production figures, under Official test, of pure-bred cows which completed their tests during the quarter ended 30th September, 1937.**
2. **Herd Testing Associations (not official) production figures for the months July to September, 1937.**
3. **Annual production figures (not official) of the Narrung Herd Testing Association, 1936-37.**

Below, Mr. H. B. Barlow (Chief Dairy Instructor) reviews the results of the various classes in the Official Tests.

Junior 2 Year Old (Standard 230lbs. Fat).—In this class 33 animals (18 Jerseys, 2 Friesians, 9 A.I.S., and 4 Ayrshires) were submitted to test; 28 cows (13 Jerseys, 2 Friesians, 9 A.I.S. and 4 Ayrshires) completed 273 days' test and 11 Jerseys, 2 Friesians, and 8 A.I.S. obtained certificates; 3 cows (2 Friesians and 1 Jersey) produced in excess of 350lbs. fat, headed by Mr. C. J. Morris' "Murray Glen Princess Marina" with 448.29lbs. fat.

Senior 2 Year Old (Standard 250lbs. Fat).—Nine cows (7 Jerseys and 2 Ayrshires) were submitted to test, 5 cows, all Jerseys, completed 273 days' test, and 3 Jerseys reached the required standard; while 1 Jersey, Mr. J. M. Bray's "Sweet Haven Carnation" produced 366.92lbs. fat.

Junior 3 Year Old (Standard 270lbs. Fat).—Fourteen cows (6 Jerseys, 6 A.I.S. and 2 Ayrshires) were submitted to test; 12 cows (6 Jerseys, 5 A.I.S. and 1 Ayrshire) completed 273 days, and 8 cows (6 Jerseys and 2 A.I.S.) obtained certificates; 5 cows, all Jerseys, produced over 350lbs. fat, headed by Mr. C. E. Verco's "Navua Bravo Queen 2nd" with 559.64lbs. fat.

Senior 3 Year Old (Standard 290lbs. Fat).—Seven cows (6 Jerseys and 1 A.I.S.) were submitted; 4 cows, all Jerseys, completed 273 days' test and obtained certificates; 2 cows produced in excess of 350lbs. fat, headed by Mr. D. Fitzgerald's "Raglan Melba" with 400.48lbs. fat.

Junior 4 Year Old (Standard 310lbs. Fat).—Five cows (2 Jerseys and 3 A.I.S.) were submitted to test, and all completed 273 days, while 2 Jerseys obtained certificates, and exceeded 350lbs. fat, headed by Messrs. H. and A. Bohme's "Crofton Queen Kate" with 472.27lbs. fat.

Senior 4 Year Old (Standard 330lbs. Fat).—Five cows (2 Jerseys and 3 A.I.S.) were submitted, and 4 cows (2 Jerseys and 2 A.I.S.) completed 273 days' test; 3 cows (1 Jersey and 2 A.I.S.) obtained certificates, while 2 cows (1 Jersey and 1 A.I.S.) exceeded 350lbs. fat, headed by Mr. H. B. Peter's "Mira Chana Gem" with 468.70lbs. fat.

Mature Cows (Standard 350lbs. Fat).—Thirty-seven cows (15 Jerseys, 2 Friesians, 11 A.I.S., 6 Ayrshires and 3 Guernseys) commenced test; 28 cows (12 Jerseys, 2 Friesians, 7 A.I.S., 4 Ayrshires and 3 Guernseys) completed 273 days' test, and 21 cows (9 Jerseys, 2 Friesians, 7 A.I.S., 2 Ayrshires and 1 Guernsey) obtained certificates, headed by Mr. H. R. Walsh's "Morella Princess" with 549.85lbs. fat.

In all 110 cows were submitted to test; 86 completed their period of 273 days, and 62 cows passed the required standard.

Summarising the results of different breeds for the period :—

Breed.	Submitted.	Completed 273 days.	Obtained Certificate.
Jersey	56	44	36
Friesian	4	4	4
A.I.S.	33	26	19
Ayrshire	14	9	2
Guernsey	3	3	1

The two leading cows in each class are :—

	Lbs. Milk.	Average Test.	Lbs. Butterfat.
JUNIOR TWO.			
Mr. C. J. Morris' " Murray Glen Princess Marina "	9,524	4·71	448·29
Mr. C. C. T. Ottens' " Brinkworth Rosette "	6,075	6·09	369·86
SENIOR TWO.			
Mr. J. M. Bray's " Sweet Haven Carnation "	7,249½	5·06	366·92
Messrs. H. and A. Bohme's "Crofton Sunglow "	6,922½	4·95	342·39
JUNIOR THREE.			
Mr. C. E. Verco's " Navua Bravo Queen 2nd "	8,538	6·55	559·64
Mrs. Alan E. Bowman's " Pulluwewal Jean "	9,633	5·59	538·15
SENIOR THREE.			
Mr. D. Fitzgerald's " Raglan Melba "	7,617	5·26	400·48
Mr. D. Fitzgerald's " Raglan Molly "	5,958	6·18	368·33
JUNIOR FOUR.			
Messrs. H. and A. Bohme's " Crofton Queen Kate "	8,479½	5·57	472·27
Mr. E. W. Pfitzner's " Gunawah Gold Thread "	6,826½	6·01	410·09
SENIOR FOUR.			
Mr. H. B. Peters' " Mira Chana Gem "	8,286	5·66	468·70
Messrs. E. and A. Nicholls' " Kiama Beauty "	9,295½	3·80	352·82
MATURE COWS.			
Mr. H. R. Walsh's " Morella Princess "	8,505	6·46	549·85
Mr. W. Hawker's " Anama Segis Bloom "	15,910½	3·10	493·14

For the purpose of comparison, the following are the names of the cows holding State records, irrespective of breed, in their respective classes as at 31st December, 1937.

Junior Two-year-old—" Pulluwewal Jean " (Mrs. A. E. Bowman), Jersey, 516.66lbs. fat.

Senior Two-year-old—" Lanacoona Brown May " (C. E. Verco), Jersey, 633.73lbs. fat.

Junior Three-year-old—" Murray Glen Beets Superior " (C. J. Morris), Friesan, 594.52lbs. fat.

Senior Three-year-old—" Lanacoona Brown May " (C. E. Verco), Jersey, 681.37lbs. fat.

Junior Four-year-old—" Kiama Robin 2nd " (E. and A. Nicholls), A.I.S., 703.03lbs. fat.

Senior Four-year-old—" Murray Glen Princess Maggie " (C. J. Morris), Friesan, 701.02lbs. fat.

Mature—" Murray Glen Sylvia Topsy " (C. J. Morris), Friesan, 828.26lbs. fat.

Production of Butter and Cheese.

The production of butter and cheese for November, 1937, was:—Butter, 2,022,594lbs.; cheese, 1,838,089lbs.

Results of Wheat Crop Competitions, 1937

Position.	Name and Address of Competitor.	Variety.	Apparent Yield.	Freedom from Weeds.	Freedom from Disease.	Trueness to Type.	Evenness of Crop.	Total.
		Maxima—	35	25	20	15	5	100
	MIDLAND.							
	Judged by O. Bowden, District Agricultural Adviser.							
1	E. V. H. Wilsdon, Andrews	Dundee	35	24	19	14½	4	96½
2	P. McD. Smyth, Salter's Springs	Sword	33½	24	19	14½	4½	95½
3	J. Ross, Mintaro	Ranee 4H	33½	23½	19	14	5	95
	E. V. H. Wilsdon, Andrews	Dundee	33½	24	19	14½	4	95
5	W. R. Woods & Sons, Mintaro	Dundee	32½	24½	19½	13½	4½	94½
	P. McD. Smyth, Salter's Springs	Marathon	32	23½	20	14½	4½	94½
7	W. R. Woods & Sons, Mintaro	Dundee	32	24½	19½	13½	4½	94
8	G. and C. Frost, Manoora	Dundee	32	23½	19½	14	4½	93½
	A. E. Crossing, Farrell's Flat	Dundee	31	24	20	14½	4	93½
10	J. Miller, Farrell's Flat	Dundee	30	24½	20	14½	4	93
	W. R. and J. E. Jones, Auburn	Ghurka	30	24	20	14½	4½	93
	F. Coleman & Sons, Saddleworth	Ghurka, Waratah and Green Tuscan	32½	23½	19	14	4	93
13	J. Ross, Mintaro	Ghurka	32	23½	19	13½	4½	92½
	A. R. Bagshaw, Saddleworth	Dundee	30	24½	19½	14½	4	92½
15	W. Cornwell, Hilltown	Dundee	31	24½	18½	13½	4½	92
16	W. R. and J. E. Jones, Auburn	Waratah	29	24	19½	14½	4½	91½
	M. and E. Bailey, Hanson	Dundee	28½	24½	19½	14½	4½	91½
	P. McD. Smyth, Salter's Springs	Ford	32	23½	18½	13	4½	91½
19	P. V. Browne, Andrews	Dundee	30	23½	19½	14½	3½	91
	E. J. Williams, Tothill's Creek	Ranee 4H	27½	24½	19½	14½	5	91
21	L. Harvey, Hilltown	Dundee	28	24½	19½	14½	4	90½
	Gask Bros., Gum Creek	Dundee	28½	24	19½	14	4½	90½
	J. H. Torr, Farrell's Flat	Free Gallipoli and Mogul	28½	23½	19½	14½	4½	90½
	S. T. Miller, Gum Creek	Ranee 4H	28½	24½	19½	14	4	90½
25	J. Miller, Farrell's Flat	Sword	28½	24½	19½	13	4	89½
	A. E. Launer, Merildin	Dundee	30	22½	19½	13½	4	89½
	A. J. Jones, Manoora	Ghurka	32½	23	17½	13½	3	89½
	H. Schunke, Manoora	Free Gallipoli	29	23	19½	14½	3½	89½
29	H. Michael, Hilltown	Dan	27½	23½	19	14½	4½	89
	Gask Bros., Gum Creek	Carrabin	27	24	19½	14	4½	89
	H. H. Bulbeck, Hilltown	Dundee	28½	24	19	14	3½	89
32	A. J. Jones, Manoora	Ghurka	32½	22	17½	13½	3	88½
	S. Garrard, Farrell's Flat	Free Gallipoli	32	19	19½	14	4	88½
34	R. E. Dinham, Hilltown	Dundee	27½	23½	18½	14	4½	88
	B. Behn, Riverton	Sword, Dundee and Ghurka	28½	23	19	13½	4	88
36	R. R. Bartholomaeus, Farrell's Flat	Dundee	29	22	19	14	3½	87½
37	J. B. Sheckleton, Hilltown	Gluclub	27½	24	19	12	4½	87
	R. F. T. Rogers, Hanson	Dundee, Free Gallipoli	28½	23	18	13½	4	87
	S. Garrard, Farrell's Flat	Sword, Dundee and Free Gallipoli	29	23	18	12½	4½	87
	P. J. Scholz, Eudunda	Sword	27½	23	19	13	4½	87
41	Gask Bros., Gum Creek	Dan	25	24	19	13½	4½	86
42	R. F. Thomas, Hallett	Ghurka	24	24½	19	14	4	85½
	J. R. White, Kooringa	Ranee 4H	26½	23½	18½	13	4	85½
	F. Kelly, Manoora	Dundee	26	23	19½	13½	3½	85½
	A. G. Kirk, Farrell's Flat	Dundee and Sword	24	24	20	13½	4	85½

RESULTS OF WHEAT CROP COMPETITIONS—*continued.*

Position.	Name and Address of Competitor.	Variety.	Apparent Yield.	Freedom from Weeds.	Freedom from Disease.	Trueness to Type.	Evenness of Crop.	Total.
		Maxima—	35	25	20	15	5	100
	MIDLAND—continued.							
	W. E. Hansen, Eudunda	Dundee	26	23	18½	13½	4½	85½
47	L. Martin, Farrell's Flat	Dundee	23½	23½	20	14½	3½	85
	R. W. Miller, Farrell's Flat	Dundee	25	23½	19	13½	4	85
49	W. E. Blatchford, Mintaro	Ranee 4H	28½	21	19	12	4	84½
	T. Freebairn, Alma	Sword	29	21½	16½	13½	4	84½
	H. B. Stockman, Kooringa	Ranee 4H	29	19	19	13	4½	84½
52	P. Glynn, Rhynie	Dan	29	21	17	13	4	84
	Sholz Bros., Kooringa	Dundee	25	23	19	13	4	84
	J. Kildea, Hansborough	Dundee	24	24	19	13	4	84
	A. M. Ross, Salter's Springs	Sword and Dan	26	24	18½	11½	4	84
	McKenzie Bros., Alma	Sword	25	23½	17½	13½	4½	84
	H. W. Brown, Alma	Sword	26	22½	19	13	3½	84
	W. T. Allen & Sons, Auburn	Dundee	27	21	19½	13	3½	84
59	R. F. Thomas, Hallett	Dundee	20	24½	19½	14½	4½	83
	W. Hendry, Manoora	Free Gallipoli	27	23½	19½	10	3	83
61	W. J. Holding, Eudunda	Dundee and Baldmin	26	23½	16	12	4	81½
	H. G. Allen, Auburn	Ranee 4H	22½	23	19½	12½	4	81½
	B. H. Kleinig, Hanson	Ranee 4H	25	21½	19	12	4	81½
64	H. E. Atkins, Hanson	Free Gallipoli	24	22	17	14	4	81
	T. Freebairn, Alma	Dundee	25	22	18	12	4	81
66	P. T. Turner, Kooringa	Nabawa and Bena	23½	21	19	12	4	79½
67	M. Hogan, Leighton	Gallipoli	22	23	19	10	4	78
68	R. Roebuck, Eudunda	Mogul, Ranee and Dundee	22	21½	18	12	4	77½
	FLINDERS.							
	Judged by H. D. ADAMS, District Agricultural Adviser.							
1	H. O. Clements, Yeelanna	Waratah	33	24½	19½	14½	4½	96
2	R. R. Wilson, Yeelanna	Ford	33	24½	19	14	4½	95
	W. H. Watkins, Yeelanna	Ford	32	24½	19½	14½	4½	95
4	R. R. Wilson, Yeelanna	Improved Ford	31	24½	19½	14½	4	93½
5	M. Aikenhead, Brimpton Lake	Ford, Ranee	30	24½	19	13	4	90½
	H. Glover, Yeelanna	Sword	31	24	18	13½	4	90½
	L. Modra, Yeelanna	Sword, Ranee	30	24	19	13½	4	90½
	E. Fitzgerald, Cockaleechie	Ford	31	23½	18½	13½	4	90½
9	Smith Bros., Yeelanna	Improved Ford	28	24	19	14	4½	89½
10	E. W. Price, White's River	Ford	30	23	17½	13	4	87½
	P. H. Wagner, Brimpton Lake	Ford	27	24	19	13½	4	87½
12	J. Clothier, Brimpton Lake	Gluyas	25	24	18½	14	4	85½
13	L. M. Kelly, Brimpton Lake	Nabawa	25	23	18	13½	4	83½
14	V. R. Dodd, Brimpton Lake	Ranee	23	23½	18½	14	4	83
	M. Aikenhead, Brimpton Lake	Sword	25	23	18	13½	3½	83

Analyses of Arsenate of Lead

In the Tables hereunder the results of analyses are given of 15 samples of lead arsenates collected recently in South Australia by inspectors of the Department of Agriculture. A perusal of these Tables will enable the consuming public to form a fair idea of the relative merits of the several makes on the local market and will give the manufacturers an opportunity, which they fully appreciate, of comparing the worth of their lines with those of their competitors.

To add further to the interest of these Tables an average percentage content of the 15 samples has been prepared; it has been taken on the "moisture free" basis, and is as follows:—

Average of Fifteen Samples

	Per Cent.
Lead oxide	63.84
Arsenic expressed as arsenic pentoxide	31.83
Water soluble arsenic expressed as arsenic pentoxide	.18
Undetermined	4.15
	100.00

Suspension tests:—
5 minutes = 76.79 per cent.
30 minutes = 58.31 per cent.

The individual contents of lead oxide in these 15 samples ranged from 61.8 to 65 per cent., the arsenic oxide from 30.6 to 32.7 per cent., and the arsenic in a soluble form from .04 to .43 per cent.

It was in the suspension tests, however, that the most marked disparities occurred. In this direction, under the 5 minutes test, the highest place was gained with a 95.5 per cent. suspension, and the lowest place filled by a suspension of 13.9 per cent. The 30 minutes test found 89.5 per cent. to be the best, and, indeed, a very creditable result, while the preparation having the weakest powers of suspensibility fell to the low figure of 10.4 per cent.

Or by taking a mean of the 5 and the 30 minutes tests of each sample separately the resulting figures seem to offer a better comparison. By this method it is found that the percentages remaining in suspension were:—

	Per Cent.
1 sample reached	92
5 samples reached between	80 and 90
4 samples reached between	70 and 80
1 sample reached between	60 and 70
1 sample reached between	50 and 60
1 sample reached between	30 and 40
1 sample reached between	20 and 30
1 sample reached only	12.1

The Tables of analyses as furnished by the Department of Chemistry are now appended:—

No.	Brand.	Moisture.	Lead Oxide. (PbO.)	Total Arsenic, Expressed as As_2O_5.	Water Soluble Arsenic, Expressed as As_2O_5.
		%	%	%	%
3421	" Lunevale " Powder	0·7	63·4	31·8	0·11
3422	Blair's Powder	0·2	63·8	31·8	0·16
3423	" Aero " Powder	0·6	64·5	31·8	0·15
3424	" Aero " Paste	51·2	31·7	15·0	0·02
3425	" Elephant " Powder	0·9	63·1	31·8	0·16
3429	Cooper's " Arsinette " Powder	0·6	61·5	31·5	0·18
3430	Hemingway's Powder.......	0·3	64·7	31·5	0·34
3431	" Palmprest " Powder	0·3	64·1	30·5	0·07
3433	" Vallo " Paste	48·9	32·8	16·7	0·16
3434	" Vallo " Powder	0·6	63·9	31·7	0·43
3436	Berger's Powder	0·2	64·1	32·5	0·18
3438	" Plane " Powder	0·6	62·7	31·8	0·15
3439	Berger's Paste	53·5	29·7	14·9	0·02
3440	Berger's Colloidal	41·8	36·1	18·0	0·08
3441	" Blue Bell " Paste	49·5	32·2	16·4	0·08

On Moisture Free Basis.

No.	Brand.	Lead Oxide (PbO.)	Total Arsenic, Expressed as As_2O_5.	Water Soluble Arsenic, Expressed as As_2O_5.	Suspension Tests.	
					5 Mins.	30 Mins.
		%	%	%	%	%
3421	" Lunevale " Powder	63·9	32·1	0·11	74·2	33·7
3422	Blair's Powder	63·9	31·9	0·16	87·8	69·4
3423	" Aero " Powder ..	64·9	32·0	0·15	81·0	59·7
3424	" Aero " Paste	65·0	30·8	0·04	13·9	10·4
3425	" Elephant " Powder	63·6	32·1	0·16	95·2	82·1
3429	Cooper's " Arsinette" Powder	61·8	31·7	0·18	84·1	77·7
3430	Hemingway's Powder	64·9	31·6	0·34	87·3	67·3
3431	" Palmprest " Powder	64·3	30·6	0·07	33·6	11·1
3433	" Vallo " Paste	64·1	32·7	0·32	83·9	55·9
3434	" Vallo " Powder ..	64·2	31·9	0·43	90·7	59·0
3436	Berger's Powder ...	64·2	32·6	0·18	42·9	19·2
3438	" Plane " Powder ..	63·1	32·0	0·15	95·5	82·3
3439	Berger's Paste	63·9	32·0	0·04	93·5	78·9
3440	Berger's Colloidal ..	62·0	30·9	0·14	94·6	89·5
3441	" Blue Bell " Paste	63·8	32·5	0·16	93·6	77·8

The Farm Garden.

[J. H. Weiss, (Yadnarie).]

Every farmer in this district should try to grow his own vegetables and fruit, which on account of distance from the city markets never seem to be so fresh and wholesome as those grown in the home garden. The first essential is a good water supply. If a farmer has his sheds and stables constructed with iron roofs it would pay him to build a large concrete tank and make use of the water in the garden rather than let it run to waste. If a dam is close to the house the water could be pumped to the garden either by windmill or engine. The site of the garden should be as close as possible to the house if the soil is suitable, as any spare time can be spent in the garden. If the clay is shallow, about a foot of clay should be removed and replaced with good soil. If the soil is inclined to be ashy or rubbly, manure should be used sparingly. All vegetables, tomatoes, and cucumbers should be grown in trenches with the sides and ends filled well up. This method requires less water because it drains to the middle of the trench. All vegetables should be of early and good variety. They grow quicker and need less water. Some gardeners plant a lot of one kind of vegetables at the same time. That is a mistake; different varieties should be planted at intervals of about six to eight weeks, and not too many at a time, all through the year. Tomatoes and cucumbers should be planted at the end of August or beginning of September. They should be well sheltered from the winds. All tomatoes should be trellised; they get more air and light and last much longer. A farm should also have a few fruit trees and vines. Grape vines will grow in practically any soil. They should be trellised in this district to prevent the wind breaking off the shoots. The fruit trees in this district should be at least seven to eight yards apart. Trees planted closer will not do so well. The best kind of trees to plant are apricots, peaches, nectarines, and a few fig trees. If the water supply allows it, a few flowers should also be grown, as it helps to beautify the home.

Rainfall Table

The following figures, from data supplied by the Commonwealth Meteorological Department, show the rainfall of the subjoined stations for the month and to the end of December, 1937; also the average precipitation for December, and the average annual rainfall.

Station.	For Dec., 1937.	Av'ge. for Dec.	For Year 1937.	Av'ge. Annual Rainfall.
FAR NORTH AND UPPER NORTH.				
Oodnadatta	0·01	0·45	1·46	4·60
Marree	0·50	0·72	6·71	5·78
Farina	0·13	0·56	6·37	6·30
Copley	0·25	0·75	7·79	7·72
Beltana	0·49	0·79	10·01	8·34
Blinman	0·32	0·89	12·82	11·64
Hookina	0·48	1·03	13·59	10·85
Hawker	0·41	0·85	14·95	12·04
Wilson	0·33	0·90	13·77	11·63
Gordon	0·99	0·87	13·44	10·25
Quorn	0·52	0·79	16·66	13·02
Port Augusta	1·01	0·59	13·55	9·38
Bruce	0·58	0·86	14·32	9·78
Hammond	0·47	0·86	13·79	11·02
Wilmington	0·36	0·90	22·15	17·17
Willowie	0·93	0·85	14·88	12·07
Melrose	1·99	1·05	27·88	22·79
Booleroo Centre	0·68	0·97	19·65	15·08
Port Germein	0·70	0·84	14·42	12·49
Wirrabara	0·96	1·03	24·92	19·13
Appila	1·70	0·98	18·80	14·55
Cradock	0·37	0·88	13·82	10·62
Carrieton	0·64	0·97	14·10	12·06
Johnburg	0·47	0·93	14·29	10·47
Eurelia	0·46	0·88	14·98	12·61
Orroroo	2·16	0·84	17·81	13·10
Nackara	1·24	0·92	16·27	11·09
Black Rock	0·86	0·84	12·56	12·24
Oodlawirra	0·97	1·16	15·05	11·37
Peterborough	0·79	1·00	11·91	13·11
Yongala	1·87	1·05	16·62	14·37
NORTH-EAST.				
Yunta	1·66	0·73	14·10	8·44
Waukaringa	2·16	0·70	12·80	7·85
Mannahill	1·00	0·73	11·87	8·06
Cockburn	0·66	0·65	10·25	7·85
Broken Hill	1·05	0·80	9·47	9·37
LOWER NORTH.				
Port Pirie	0·99	0·79	16·21	13·16
Port Broughton	0·66	0·69	16·91	13·82
Bute	0·92	0·72	17·83	15·36
Laura	0·96	0·90	19·28	17·88
Caltowie	2·83	0·98	19·24	16·65
Jamestown	2·67	1·09	20·14	17·63
Gladstone	2·26	0·90	19·79	16·24
Crystal Brook	1·32	0·90	19·78	15·72
Georgetown	1·61	0·98	18·40	18·17
Narridy	1·04	0·88	20·34	15·66
Red Hill	1·08	0·86	20·39	16·54
Spalding	1·87	1·17	18·15	18·51
Gulnare	1·04	1·05	19·28	18·37
Yacka	0·54	0·92	17·89	15·34
Koolunga	0·67	0·93	16·85	15·21
Snowtown	1·12	0·78	18·69	15·67
LOWER NORTH—*continued*.				
Brinkworth	1·51	0·91	19·01	15·60
Blyth	0·78	0·92	18·05	16·68
Clare	1·66	1·15	28·04	24·42
Mintaro	1·77	1·18	27·52	23·27
Watervale	2·46	1·29	31·30	26·66
Auburn	3·08	1·08	25·75	23·89
Hoyleton	1·82	0·88	21·00	17·27
Balaklava	2·00	0·81	20·02	15·34
Port Wakefield	2·59	0·63	19·25	12·90
Terowie	1·54	1·04	16·78	13·29
Whyte-Yarcowie	2·24	0·88	17·75	13·55
Hallett	1·31	1·02	19·50	16·37
Mount Bryan	1·08	1·06	20·56	16·74
Kooringa	1·11	0·96	21·14	17·75
Farrell's Flat	1·29	0·99	23·55	18·51
WEST OF MURRAY RANGE.				
Manoora	1·05	1·09	20·17	18·87
Saddleworth	0·96	1·00	22·99	19·58
Marrabel	1·90	1·00	23·59	19·90
Riverton	1·59	0·97	23·22	20·80
Tarlee	1·97	0·97	19·47	18·06
Stockport	2·45	0·97	20·12	17·04
Hamley Bridge	3·05	0·95	18·65	16·50
Kapunda	2·61	1·03	19·22	19·71
Freeling	2·62	0·94	16·14	17·73
Greenock	2·40	1·09	19·43	21·42
Truro	2·87	0·95	19·23	19·72
Stockwell	2·84	1·04	19·61	19·98
Nuriootpa	2·35	1·14	21·40	20·77
Angaston	2·56	1·10	22·49	22·29
Tanunda	2·04	1·01	21·23	21·94
Lyndoch	3·45	1·04	22·50	23·17
Williamstown	2·85	1·09	25·65	27·41
ADELAIDE PLAINS				
Owen	1·68	0·74	21·50	14·83
Mallala	1·24	0·87	14·88	16·39
Roseworthy	1·86	0·86	16·52	17·37
Gawler	2·03	0·90	18·61	18·81
Two Wells	1·20	0·85	14·85	15·75
Virginia	1·39	0·93	17·81	17·17
Smithfield	1·37	0·92	20·08	17·62
Salisbury	1·53	0·90	20·02	18·49
Adelaide	2·22	1·03	23·01	21·17
Glen Osmond	1·72	1·19	26·22	25·84
Magill	2·22	1·25	26·36	25·24
MOUNT LOFTY RANGES.				
Teatree Gully	2·21	1·30	27·58	26·83
Stirling West	3·68	1·87	49·42	46·86
Uraidla	2·41	1·79	42·87	43·64
Clarendon	2·66	1·40	31·15	32·74
Happy Valley Res.	1·99	—	24·42	—
Morphett Vale	2·90	0·99	25·90	22·56
Noarlunga	2·09	0·82	25·07	20·35
Willunga	1·50	0·93	23·83	25·91
Aldinga	1·29	0·81	19·76	20·11

RAINFALL—*continued.*

Station.	For Dec., 1937.	Av'ge. for Dec.	For Year 1937.	Av'ge. Annual Rain-fall.
MOUNT LOFTY RANGES—*continued.*				
Myponga	1·82	1·08	29·75	29·45
Inman Valley	2·32	—	28·24	—
Yankalilla	2·31	0·87	23·17	22·70
Mount Compass	1·55	1·30	28·81	36·32
Mount Pleasant	2·25	1·06	24·43	27·02
Birdwood	1·88	1·19	26·75	28·86
Gumeracha	3·10	1·35	33·22	33·12
Millbrook Reservoir	2·70	1·59	36·74	34·00
Lobethal	2·64	1·38	37·83	35·79
Woodside	2·09	1·27	31·83	32·01
Hahndorf	2·41	1·37	31·99	34·65
Nairne	2·20	1·16	25·42	28·04
Mount Barker	2·69	1·27	28·64	31·17
Echunga	2·60	1·31	32·06	33·25
Macclesfield	2·22	1·23	25·07	30·29
Meadows	2·46	1·41	32·84	35·93
Strathalbyn	2·96	0·89	19·69	19·35
MURRAY FLATS AND VALLEY.				
Meningie	2·44	0·80	17·24	18·28
Milang	2·35	0·70	13·85	14·85
Langhorne's Creek	3·76	0·84	16·72	14·99
Wellington	3·72	0·81	16·91	14·68
Tailem Bend	2·95	0·99	16·36	15·19
Murray Bridge	2·71	0·78	11·65	13·51
Callington	1·28	0·83	11·85	15·14
Mannum	4·18	0·64	14·51	11·51
Palmer	2·71	0·87	17·12	15·70
Sedan	2·81	0·65	13·32	11·99
Swan Reach	2·14	0·71	11·88	10·60
Blanchetown	2·66	0·76	12·38	10·97
Eudunda	4·49	0·96	24·60	17·16
Point Pass	3·57	1·02	22·79	16·93
Sutherlands	3·03	0·72	18·42	10·73
Morgan	3·19	0·78	13·23	9·12
Waikerie	2·04	0·81	12·82	9·71
Overland Corner	1·29	0·78	10·21	10·21
Loxton	1·26	0·81	10·98	11·34
Berri	1·60	0·88	12·38	10·11
Renmark	1·68	0·79	13·18	10·37
WEST OF SPENCER'S GULF.				
Eucla	0·99	0·50	8·76	10·06
Nullarbor	1·38	0·40	6·93	8·79
Fowler's Bay	0·63	0·31	10·82	11·89
Penong	1·04	0·48	13·81	12·22
Koonibba	0·81	0·56	13·27	12·16
Denial Bay	0·63	0·41	12·85	11·31
Ceduna	0·45	0·43	10·79	10·30
Smoky Bay	0·30	0·43	11·45	10·42
Wirrulla	0·34	0·48	14·13	10·71
Streaky Bay	1·04	0·42	17·12	14·85
Chandada	1·39	0·44	15·45	12·31
Minnipa	0·90	0·61	15·07	13·83
Kyancutta	1·17	0·53	14·15	13·16
Talia	0·44	0·57	16·89	14·50
Port Elliston	0·94	0·48	17·48	16·44
Lock	1·46	0·77	15·85	16·23
Mount Hope	0·99	—	21·71	—
Yeelanna	2·44	0·53	17·61	15·92
Cummins	2·16	0·57	19·61	17·47
Port Lincoln	1·37	0·68	18·41	19·27
Tumby	1·59	0·73	12·43	14·16
Ungarra	2·29	0·73	18·05	16·81
Port Neill	1·19	0·74	10·79	13·06
WEST OF SPENCER'S GULF—*continued.*				
Arno Bay	1·48	0·65	11·94	12·72
Rudall	2·19	0·54	14·48	12·94
Cleve	2·12	0·68	14·87	14·90
Cowell	0·98	0·53	8·98	11·06
Miltalie	1·30	0·62	15·15	13·72
Mangalo	1·64	0·64	12·34	13·80
Darke's Peak	1·74	0·77	17·33	15·08
Kimba	2·72	0·53	13·48	11·64
YORKE PENINSULA.				
Wallaroo	0·85	0·61	15·43	13·93
Kadina	0·92	0·67	17·19	15·53
Moonta	0·80	0·68	13·90	14·98
Paskeville	1·36	0·72	17·57	15·47
Maitland	2·35	0·78	21·91	19·76
Ardrossan	2·06	0·58	18·66	13·91
Port Victoria	2·35	0·68	18·13	15·33
Curramulka	1·53	0·73	17·32	17·72
Minlaton	2·49	0·63	18·76	17·65
Port Vincent	1·27	0·67	13·31	14·26
Brentwood	1·41	0·62	19·11	15·52
Stansbury	2·22	0·61	18·10	16·75
Warooka	1·47	0·55	17·33	17·38
Yorketown	1·72	0·60	17·60	16·81
Edithburgh	1·56	0·61	15·03	16·31
SOUTH AND SOUTH-EAST.				
Cape Borda	3·03	0·78	29·30	24·83
Kingscote	2·34	0·73	20·91	19·20
Penneshaw	1·24	0·82	20·56	19·09
Victor Harbour	2·18	0·88	22·76	21·37
Port Elliot	2·60	0·85	21·84	19·93
Goolwa	3·49	0·78	21·78	17·85
Maggea	3·30	0·86	13·42	10·32
Copeville	4·15	0·85	14·42	11·64
Claypans	3·31	0·94	14·47	10·77
Meribah	1·14	0·79	10·53	11·26
Alawoona	1·02	0·73	12·17	10·43
Caliph	1·75	0·59	13·35	10·60
Mindarie	2·20	0·84	13·28	12·16
Sandalwood	3·64	0·92	15·59	13·67
Karoonda	2·90	1·06	13·96	14·33
Pinnaroo	1·79	0·82	12·56	14·14
Parilla	3·95	0·78	15·60	13·67
Lameroo	3·09	0·93	15·03	15·79
Parrakie	1·93	0·86	13·51	14·58
Geranium	2·40	1·02	14·38	16·36
Peake	2·60	0·91	15·61	15·87
Cooke's Plains	2·76	0·85	16·53	15·33
Coomandook	3·90	0·80	16·76	17·01
Coonalpyn	4·99	0·90	21·11	17·65
Tintinara	4·71	1·03	21·28	18·68
Keith	3·07	0·96	19·27	17·95
Bordertown	3·16	1·05	19·20	19·16
Wolseley	3·14	0·97	18·77	18·50
Frances	2·66	1·25	18·25	20·18
Naracoorte	3·41	1·15	21·76	22·64
Penola	2·83	1·31	22·46	25·89
Lucindale	6·93	1·14	28·95	23·48
Kingston	5·41	1·11	23·07	24·24
Robe	7·39	1·02	31·27	24·63
Beachport	6·44	1·12	29·70	27·06
Millicent	6·14	1·32	32·67	29·93
Kalangadoo	4·22	1·51	28·47	32·00
Mount Gambier	3·98	1·62	22·32	30·29

Agricultural Bureau of South Australia

Reports Received from Branches

Blewitt Springs, 30th November, "Trip to Adelaide Wool Stores"; 14th December, "Glassmaking," A. Trembath. Glencoe, 7th December, "Milk," A. G. Edquist and W. H. Downes. Hartley, 15th December, Question Box. Hilltown, 10th November, Field Day. Keyneton, 10th November, address, H. J. Apps; 8th December, address, J. B. Harris. Lenswood and Forest Range, 29th November, visit from Balhannah Branch. Lyndoch, 16th November, address, A. G. Edquist; 14th December, address, J. B. Harris. McLaren Flat, 16th December, Annual Smoke Social. Milang, November, visit by Strathalbyn Branch. Morchard, 12th November, Annual Meeting. Mount Barker, 22nd November, address, H. Stephenson, junior. Mount Pleasant, 8th December, "Blowfly Experiments," F. Staples. Wirreanda, 15th November, "Cement," O. P. Wallage, and "Grasshoppers," J. S. Bennie, Yadnarie, 18th August, "Shoeing Horses," H. W. Zinkler; 16th November, "Soils," W. Crispin.

Papers Read at Conferences

How to Make a Living on a 2,000 Acre Farm

[W. E. Stone, Petina (Poochera Conference).]

The object of this paper is to outline a method to be employed in an endeaour to make a living on a 2,000 acre farm in a 10in. rainfall. It is understood that the meaning of a 2,000 acre farm is 2,000 acres of cleared arable land, with reasonable facilities for the provision of water, either by Tod river or by wells or catchment tanks.

The Department of Agriculture says that the dryer the wheatgrowing area the more necessary it is to widen the rotation of cropping with wheat, meaning that a period of at least five years should elapse before wheat is grown on the same land.

With this type of rotation the best results can be obtained from fallow; which in dry country is hard to prepare if the land is not brought into a condition to be fallowed. I have noticed that fairly heavy land which has been fallowed and grown wheat too frequently has started to drift, and my suggestion is that the organic matter has been gradually burnt out by this too frequent fallowing and the texture of the soil considerably lightened. In an endeavour to replace this organic matter I propose to run sheep in connection with wheatgrowing.

I have heard it said that if proper proper provision for water is made at least one breeding ewe should be carried for every acre of wheat sown, when only wool is aimed at; but if fat lambs are to be produced at least 30 per cent. merino ewes could be run, as the lambs are only on the farm during the flush of the year, and no natural increase has to be provided for.

Laying out the Farm.

In laying out the farm I propose to have 20 acres set aside for house, sheds, yards and garden, and a seed producing paddock of Wimmera rye grass. This latter could be used for a ram paddock in the off season. If this paddock is shut up in September, sufficient seed would be obtained for the next year's seeding.

With this system I propose to fallow 400 acres to be sown down to wheat. The following year it would be sown with oats at the rate of one bushel to the acre and 2lbs. of Wimmera rye grass. By following this rotation it would be five years before this land came under fallow again. This method has every acre doing something that will show a profit.

The wheat grown would be harvested for grain, and all above seed requirements would be marketed.

The oats would be treated in a different manner, a fair portion being cut for hay at the right stage. The other part would be harvested for grain for next year's seed, horse feed, and also for the feeding of sheep when necessary.

I propose to sow 45lbs of super per acre with 1bush. of oats and 2lbs. Wimmera rye grass, at the same time realising that a rebate can be obtained on all super used other than with wheat.

Sheep.

I intend working up a merino flock for wool. If suitable sheep are not already on hand, it is advisable to procure a line of cast-off-age ewes from a station of the strong wool type and endeavour to keep the wool strong but soft handling. A great mistake made by many farmers is to change the blood of their rams. When a suitable type of ram is found, keep to that particular breeder; that is the only way of breeding to any degree of evenness both in type and wool. By carrying out the above advice a flock can be produced on the farm to cut 12lbs. of wool and over.

Sheep should be culled annually for three points, namely, age, wool and type. The better breed the flock becomes the better will be those that have to be discarded. A ready market can always be obtained for them after those required for meat on the farm are taken out.

Feeding.

A little has been said about breeding, but one must not lose sight of the fact that feeding plays a very important part.

All crops except wheat can be grazed at certain times in the year, and in this way grazing paddocks can be allowed to get well started before standing up to the bulk of the stock.

With 200 acre paddocks the feed could be handled to a greater advantage.

To maintain stock, especially sheep, in good condition at certain periods of the year, hand feeding must be resorted to. Large stock can be fed at the mangers, but sheep must have room, so paddock feeding is necessary. Automatic feeders seem to be the most effective and economical method. These feeders can be purchased for about £12. The feeders are about 12ft. long and hold one bag of chaff per foot.

The hay previously cut can be chaffed and with a few oats could be used with no waste to keep the sheep in good contion. By this method a higher value could be obtained for both these fodders than through the ordinary market.

Care of the Flock.

Owing to the seriousness of the sheep being struck by flies, sheep should be crutched at least once a year, three weeks before lambing. It is useless just to clean out the breech. The best method is to sit the sheep up, realising the ewe is in lamb, clean the udder, also inside the legs, going well up the tail. Some say that by taking off so much wool there is a waste, but it is quite the reverse. The wool when sold will more than pay for the crutching. I find that notwithstanding all the dressings on the market, no other method is so good for preventing the sheep from being struck.

Preparing the Wool for Market.

With a farmer's flock do not over-class, but aim at one line of good even wool. If the flock is bred and culled right there should be practically no classing, as all the wool would be of a similar type. The skirting should be done thoroughly, taking off only what is necessary and always keeping the stained wool by itself. In some of the returns pieces have brought nearly the price of fleeces. This shows that the skirting has been done too heavily, making the pieces rich at the expense of the fleece. Bales should be pressed evenly and made shapely. The sewing should be neat and the branding done with stencils, not with a tar stick.

In running a 2,000 acre farm a wide rotation should be adhered to. Small paddocks should be used and the flock carefully bred and fed.

Pasture Improvement

[C. L. BAGLEY, Poochera (Poochera Conference).]

Can this be done, or is it a payable proposition in a district such as ours? There is not the least doubt that in this locality there is room and need for experiment in this direction. Under the present-day prices for wool and lambs we could all grow fodder of some sort and make it a paying proposition if we had our selections better subdivided and facilities for watering, &c., more up to date, that is, more watering places, to give the minimum of travelling for water in the summer months.

A number of farmers in this district have been going in for growing oats, rye grass, etc., this last year or two with the idea of raising the stock carrying capacity of their holdings.

I have been carrying out a little work in this respect during the last three years, and although not to the stage that I could claim to have made any improvement, from a monetary point of view, the observations made have given me enough encouragement to say that with careful attention to these matters, we can hope to increase our flocks enough to repay us for the money and time spent now in the experimental stages.

Wimmera Rye Grass.

Wimmera rye grass, no doubt, is the grass that will appeal to us all first to experiment with, owing to the success that we hear of its attaining in other districts; and then again, if it does prove suitable to our conditions, it can be very cheaply established. Three years ago I planted 100 acres with this grass, about 70 acres of which I planted along with a wheat crop, about 30 acres being planted for a pasture with lucerne seed. I was very pleased with the growth it showed in both instances. Although it did not come away very quickly in the cold weather, it stooled out well, growing on the average 8-10 stems on a plant. When the warm weather set in, it shot up, very quickly attaining a height of 10 to 12 inches. I sowed the 70 acre paddock with wheat again last season, drilling it in early without any cultivation. We received very late opening rains last year, and though the grass came up all right, it made very little growth. By the time Spring had set in, there was little or no moisture left in the ground, and I began to think it would never seed, but a late rain, too late to be of any benefit to the wheat or other grasses, brought on the rye grass rapidly; and within two or three weeks it was about 6 inches high and out in seed. Still it did not show nearly as strong and robust a plant as it did in the first year. There were patches in the paddock that made very little growth. There were other patches where it was rye grass and no wheat.

I have left this paddock out for pasture this season, and at this juncture it is practically impossible for me to form an opinion as to what growth it will make in this its third season, but it has come up and come up thickly. I have been feeding it down fairly heavily, and other grasses appear to be making more growth than the rye grass; but this may be caused through it being more palatable to the sheep and lambs.

Last season I sowed about 210 acres with this grass, 120 with oats, and 90 with wheat, getting a good rain in April this season. The rye grass grew very quickly until the cold weather set in. I kept the stock off this paddock until it had a good start. Again it has been very noticeable how the sheep ate the rye grass, right down to the roots before they started on the mustard or barley grass, or even the self-sown oats.

I have no doubt that the grass planted in these two paddocks has enabled me to keep the sheep (400 ewes and about 250 April lambs) in fairly good order. To draw a comparison, I have another paddock of 150 acres that has not been planted with the rye grass; this is the second year it has been out of wheat. I have had all the sheep in this paddock at two periods of 5 days each, and had 50 in there for two weeks at another period. There is no comparison between the paddocks for the body of feed at the present time.

Lucerne.

Perhaps many are ready to scorn the idea of growing lucerne in country like this. Although I sowed it, I was quite antagonistic to the idea. At the present time I am as interested in it as I am in the rye grass. When I came on the place there was an 80 acre paddock with a few lucerne plants scattered over it. The second year I cut up the paddock with a sundercut in the summer time. When the rain came, I put all the pressure possible to a combine to cut it again, thinking I would get rid of it altogether. But for every plant I cut up three came up in its place, and they have been coming along and thickening up ever since. The hold of these plants made me plant some more, and although I had no luck with the 30 acres I planted, I have not despaired of establishing a paddock with lucerne, and I am also quite confident that if it was established, our poor rainfall, poor land and hot dry spells would not kill it out. What its grazing or stock carrying capacity might be I am not prepared to say. I have had this lucerne eaten down well below the surface of the ground, and after a good shower of rain you have green feed in a fortnight; every year it has been getting more dense. I have recently cut it up with a combine and given it a top dressing at the same time. My reason for combining it was to try and kill Saffron thistle. At the same time, I have given it a light sprinkling of Wimmera rye grass and perennial rye grass. My idea of trying the perennial rye grass was that as the lucerne appeared to be so robust once it was well rooted, perhaps other rooted grasses would thrive also. In dealing with the planting of lucerne, I would recommend trying it on a piece of well-worked fallow, sowing as shallow and as early as possible. If you do not get it away well before the summer sets in, I do not think it would stand the long, dry first summer.

Although I have been dealing with Wimmera rye grass and lucerne I think we might easily find some other pasture more suitable for our climate and land than either of these. If we look at our natural grass, the spear grass, it is only a surface rooter and is ready to shoot out with every little fall of rain. Although heavy stocking and cultivation practically kill it out, if we only leave a paddock out and do not overstock it, we will find the spear or bunch grass coming back and ousting the barley grass and other weeds that thrive so well under cultivation. I feel confident that if we keep on we will find some herbage that will respond generously to our climate and soil.

Further to my paper of July, without a doubt the lucerne which I top dressed has done remarkably well, and now, to my mind, is so well established and looks healthy and robust enough to dispel all fears as to its unsuitability for portions of our soil at least. The growth this plant has made even during July and early August, when all other plants were at a standstill, was a pleasant surprise to me. In this I am only referring to that which was top dressed. Although the balance of the paddock came along very well, it could not be compared with the top dressed portion. I feel very confident at this stage that farmers can establish a paddock with lucerne, and that if it is looked after in the first year or two and given a top dressing, it will prove a very profitable proposition to them and prove of great value to their stock in the summer.

During the seeding operations, I sowed lucerne and rye grass along with wheat on another 50 acres or so of ground. The rye grass has been particularly slow in growth during July and August this season, both in coming along with the wheat and also on the land sown in the past and now left out for pasture. Even at this stage, it is still only high enough for a sheep pasture, but I have not the least doubt that it will thrive; in fact, I am inclined to think it may check out the barley grass. In making this latter statement I have drawn this conclusion from the poor showing of the barley grass that I have on the 30 acres I sowed with Wimmera rye and referred to earlier. In referrring to the lucerne sown with the wheat during the last season, a lot of this is now coming along quite well. It is noticeable where the crop is fairly free from grass and weeds. At this stage, I consider the Wimmera rye grass will grow fairly quickly following early opening rains, but once the cold frosty weather sets in, it is very backward and by itself it may not prove a very beneficial fodder for us to go in for extensively. I regret very much now that I did not top-dress a portion of it to see if it was more inclined to check out the barley grass, &c., under what might be called pasture-forcing methods.

The Care of the Horse

[E. G. VOUMARD, Cungena (Poochera Conference).]

The horse is the noblest of all living animals, and therefore too great care cannot be taken with them. From the time of service until the foal is born one needs to give a fair amount of consideration to the mare. Hard work will never hurt an "in-foal" mare, providing she is given a position where she will not be bumped or jostled about unnecessarily; also an occasional dose of medicine should be given to her to keep the bowels functioning in correct order. Every week-end mix Epsom salts 4ozs.; carb. soda 1 large tablespoon and Nux Vomica 15 to 20 drops, to each horse in the following method: Melt salts and soda, add Nux Vomica, also—if on hand—½gall. molasses, all into bucket, mix well and add to Sunday morning's feed—as in most cases this meal is given later than week-day meals.

Working Horses.

A horse can work from early morn until 10 minutes before sundown and do well, having 1½ hours for dinner, and if possible be unharnessed during dinner time. To work a horse throughout the day without a drink is very unfair to the animal. In suggesting that knock-off time for a horse is 10 minutes before sundown it should be pointed out that where a horse has been working hard all day and has a good sweat up, it does not give the horse a chance to dry off by the time it is dark and cold. A horse that has to be harnessed up in the morning with cold sweat still on it will soon fall away in condition, and it is more subject to sore shoulders than a horse that is properly dry; also, they cannot be brushed down correctly.

Harnessing the Team.

In the first place, use a good fitting pair of winkers, with a strong bit and coupling, kept in a soft state with plenty of oiling. If possible, the flaps should be fitted so that a horse cannot see back over them. Next, a good fitting collar, well oiled, is the main thing. A good fit to a collar is to have it so that the fingers can be put firmly between neck and collar (open hand) with 2 inches between pipe of collar and the horse's throat. I prefer two straps on the collar to the single strap, as the two hold the collar in a firmer position. Next is the hames, which some people consider not very important. No matter how well the collar fits, if the hames do not fit just as well, it will cause the horse a great deal of uneasiness. The draught on the hames means a lot as far as sore shoulders are concerned.

Chains and Swings.

In working horses in chains, care should be taken to have spreaders in them, and swings wide enough to prevent the chains from rubbing on the horses' sides, and the chains should be long enough so that spreaders and swings will not come in contact with their hocks while walking. I have known of men putting barb-wire across chains to make a slow horse keep up with faster ones. Such men are neither humane nor have any feelings for dumb animals.

Feeding.

Feeding is an all important matter in the care of the horse. Regularity in feeding hours is the main factor, but as to feed rations, much depends on the fodder one has at hand. A good ration for a horse (although it may seem small) is a kerosene tin full of chaff 3 times a day, and a double quantity at last feed at night, with a 2lb. tin of crushed oats at each feed. Feeding long hay is too much of a waste, especially if horses are inclined to fight; they throw it about with only the heads eaten off.

In conclusion, I would suggest the following:—Good soft leather on harness, kept well buckled up and clean. In case of a sore showing up on the shoulder, use the butt end of a bottle to make a small hollow in the collar and smear on the collar a paste made up of ¾lb. lard, 1lb. white lead, and 2ozs. Friars' balsam. Melt the lard and lead, then stir in balsam and stir till cold. Do not smear direct on shoulder.

Re-Allotting Deserted Farms

[W. A. Gosling, Poochera (Poochera Conference).]

Vacant lands or lands thrown up or resumed, should be joined to the farm of the settler adjoining, provided, of course, that the close settler wants it. These should be allotted at a grazing rate. For these reasons: In the first place, these farms have proved a failure to keep a man and family as a mixed farming proposition, and farmers know that in this district no one farmer can make sheep pay without cultivation, and cultivation will not pay without sheep. The carrying capacity of the general run of farms, to my idea, is from 250 to 350 sheep, and to ensure feed for these regularly, oats or other fodder needs to be sown. If each settler could carry 500 sheep with his farming, he would stand a good chance of paying his way.

To carry 500 sheep needs more land than the average farm. If any vacant farms were allotted to the adjoining farms, it would give that man land enough, but to do so even then, the land allotted would have to be at a grazing rental. Obviously, having failed as a farm for one man, providing he was a trier, it would be a failure as a farm for another. Recently two blocks have been repossessed, and the powers concerned require over £100 per year for each of them. They will not be a paying proposition for anyone taking them up. Two pounds (£2) per week before making anything is too much to tackle for sheep alone, and if farming is carried on, as it needs be, then the £2 per week becomes much more before any returns are available. There is another contributing factor to failure on these places; that is, the water rate, which in some instances is responsible for the high charge. One of these blocks at a grazing rental would make a safe proposition for the mixed farmer.

Exterminating Rabbits

[J. Maroney, Chandada (Poochera Conference).]

The only way to deal effectively with rabbits on a small holding is to destroy the burrows. This can be done either by ploughing with a single furrow plough, grubber or shovel, and working in the loose earth with a crowbar or even a mallee rail with a slight curve about 2ft. 6in. from the heavy end and about 10ft. long. The curve will act as a heel and by levering up and down in this way, it is surprising how much can be done, but it is rather hard work.

One can trap, poison or fumigate, but if one does not try each year to permanently destroy a certain number of burrows, one is not doing one's duty to neighbours or self.

Wombat Holes.

Where wombat holes cannot be ploughed or dug out, the first thing to do is to plough all around them or as near to the basin or hollow as possible. If the earth is not required, it can always be left. Then with buck-scrapers fill up all the hollows. The hollows as a rule are the openings where the rabbits pass in and out. Leave it then until the next year, and it will be found that a big percentage of the openings are done away with. Then the places which are opened should be covered with wire netting. This is done by taking a piece of netting 3ft. 6in. square, placing it over the opening, marking around it, then taking out all the earth for the full square down to the rock, or at least if not striking rock a foot deep, then throw in loose earth. If this is done carefully, very few are opened here again. Do not be in a hurry; do it well the first time. Once rabbits get out they are twice as hard to deal with next time.

The poison cart may have its good points, but it has a lot of bad ones, and one of them is that it is only used as a blind, or to say that something was done. Running around for a day or so with the cart once a year is a day or so doing nothing, or at least very little, in regard to exterminating the rabbit.

The Application of the Gas Producer to the Farm Tractor

[R. J. EVANS, Chandada (Poochera Conference).]

Some years ago the unpayable price of wheat, coupled with the high price of petrol and kerosene, caused many tractor farmers to turn their attention to the gas producer as a means of providing cheaper power. The obvious advantage of converting waste wood off the farm into charcoal and substituting it for petrol or kerosene rendered the proposition hightly attractive, but the difficulty of operating on gas, as compared with liquid fuel, caused large numbers of producers to be discarded when seasons and prices improved. Nevertheless the gas producer would probably be utilised again to keep spark-ignition tractors in operation in the event of a big rise in the price of petrol or kerosene, or the serious shortage which would arise if overseas supplies of petrol were cut off in time of war.

The Gas Producer.

The gas producer itself, in its simplest form, is a vertical cylindrical iron shell, lined with fire-brick, closed at the top and bottom, and provided at the top with an airtight lid through which the fuel is charged. There is an outlet for the gas near the top, and air and steam are admitted at the bottom just below the grate, where another door is provided in order to remove ashes. Water is generally supplied to the ash pit, as its vapour is necessary in the process of forming the gas, besides performing the valuable service of cooling the fire. Additional steam is supplied by means of a steam tank, with a pipe running inside the producer to provide quick heating when starting up. In the suction producer, the only type which came into general use in this State, the blast through the fuel bed is caused by the engine working as a pump on the induction stroke of each piston; whereas on the power type, the blast is obtained by means of a fan.

The process which goes on in the producer is strictly a chemical one which need not be detailed here, it being sufficient to say that only about a quarter of the gas is combustible, the balance being entirely useless, mostly nitrogen and carbon-dioxide. The most valuable constituent of producer-gas is carbon mon-oxide, which with a small quantity of methane, or marsh gas, makes up most of the 20 per cent. of combustible gas. After leaving the producer, the gas passes through the scrubbers or cleaning tanks, which usually consist of a water scrubber, an oil scrubber, and one or two dry scrubbers whose principal function is to remove any moisture held in suspension in the gas. The gas, along with about ⅝ to two-thirds of its volume of air is then drawn into the engine, compressed, and fired in the ordinary way. The best method of controlling the gas and air is to use 1¼ inch gas taps in preference to butterfly valves. A third tap should be fitted as close as possible to the tractor induction pipe in order to shut off the air in the piping and thus facilitate starting.

An effective producer for a 15/25 h.p. tractor is so large as to render carrying it on the tractor impossible, and it has been found that the best way is to mount the producer on its own transport and tow the transport behind the implement, conveying the gas to the tractor by means of lengths of steel exhaust piping, and 1½ inch rubber hose.

Increased Compression Ratio Necessary.

Owing to the fact that a standard petrol engine when running on gas, delivers only about 60 per cent. of the power which could be obtained from petrol, it is necessary to make certain alterations to the engine in order to regain some of the lost power. The popular method is to raise the compression ratio by fitting pistons slightly higher than standard; but the ratio cannot be raised too high or operation on petrol becomes difficult. In the case of the 2 ton Holt Caterpillar, standard compression was 75lbs. per sq. in. or a ratio of about 5 to 1. Gas pistons ⅜in. higher than standard were fitted, raising the compression to 105lbs. per sq. in. or a ratio of 6.3 to 1; but this was found to cause a breakdown of the magneto after several years use, besides causing other starting troubles through the necessity of using mica plugs. It also caused the occasional shooting of a cylinder head gasket when working on petrol or kerosene. These difficulties have apparently been completely overcome by using pistons 3/16in. higher than standard, giving a compression of about 86.5lbs. per sq. in. or a ratio of 5.4 to 1. Time will tell whether the magneto will break down again, but as porcelain plugs and cylinder head gaskets stand the strain, this seems unlikely. Besides raising the compression, extra power can be obtained by "revving" the engine faster and gearing down the transmission, and also by setting the ignition a little on the fast side; although this can be overdone. Another important point is to avoid passing the gas through the hot spot when welding the gas pipe into the tractor manifold, as cool gas is absolutely essential.

Operating the Producer.

The actual procedure to start the tractor on gas is as follows: After making sure that the scrubbers and steam tank are full, both the top and bottom doors are opened, and the coal in the producer is lighted by means of a kerosene torch under the grate. It will be found that by the time necessary oiling and greasing, &c., have been done, the water in the steam pipe will have commenced to boil. After the top door of the producer is closed down tightly, the tractor is started on petrol and the gas tap is opened, allowing the engine to draw upon the producer, sucking the gas along. After a few seconds the air tap can be opened slightly. If the producer is hot enough the engine will fire evenly on the mixture, and the petrol can be gradually shut off. It is necessary to shut off the petrol with a good tight tap, and not to rely on closing the carburetter butterfly. After the engine has been running on gas for a few minutes, it should be strong enough to start. Owing to the fact that gas is not as flexible as petrol, it is necessary to start in low gear and gradually work up into higher gears as the producer warms up. If the producer is large enough for the job (and it should hold about 4 bags of charcoal) no further stops to refuel will be necessary until dinner-time, and another fill up of coal will last until night. At night the producer can be left alight by leaving the top and bottom doors slightly ajar. This will keep the producer hot enough to get a quick start next morning. After 3 days use it is advisable to leave the producer closed all night, thus putting out the fire. It will cool off sufficiently by morning to enable the grate to be removed and cleaned of clinkers, and all ashes to be raked out of the fire box.

A 2 ton Holt Catterpillar tractor, pulling a 20 hoe combine, will cover 30 acres per day on a fuel consumption of about 1½ to 2 pints of petrol and 4 bags of charcoal.

Gestation Tables

The information contained in the subjoined tables will be found of interest to breeders of livestock.

PERIODS OF GESTATION IN NORMAL CASES.

Ass	12½ months, 380 days.
Mare	11 months, 340 days.
Cow	9½ months, 40-41 weeks, or 281 to 285 days.
Ewe and Goat	5 months, 21 to 22 weeks, or 150 to 154 days.
Sow	Less than 4 months, but over 16 weeks, 112 to 120 days.
Bitch	9 weeks, 63 to 65 days.
Cat	7 to 8 weeks, 50 to 56 days.
Hen	Sitting on eggs of the Hen, 21 days (19 to 24 days).
Hen	Sitting on eggs of the Duck, 30 days (28 to 32 days).
Duck	Sitting on eggs of the Duck, 30 days (28 to 32 days).
Goose	Sitting on eggs of the Goose, 30 days (28 to 33 days).
Turkey	Sitting on eggs of the Turkey, 26 days (24 to 30 days).

In the following Gestation Table, the periods given are 340 days for the Mare; 284 days for the Cow; 152 days for the Ewe; 116 days for the Sow.

GESTATION TABLE.

Date of Service.	Due to Give Birth.				Date of Service.	Due to Give Birth.				Date of Service.	Due to Give Birth.				Date of Service.	Due to Give Birth.			
Jan.	Mare.	Cow.	Ewe.	Sow.	Feb.	Mare.	Cow.	Ewe.	Sow.	Mar.	Mare.	Cow.	Ewe.	Sow.	April	Mare.	Cow.	Ewe.	Sow.
	Dec.	Oct.	June	April		Jan.	Nov.	July	May		Feb.	Dec.	July	June		Mar.	Jan.	Aug.	July
1	6	11	1	26	1	6	11	2	27	1	3	9	30	24	1	6	9	30	25
2	7	12	2	27	2	7	12	3	28	2	4	10	31	25	2	7	10	31	26
4	9	14	4	29	4	9	14	5	30	4	6	12	Aug. 2	27	4	9	12	Sept. 2	28
6	11	16	6	May 1	6	11	16	7	June 1	6	8	14	4	29	6	11	14	4	30
8	13	18	8	3	8	13	18	9	3	8	10	16	6	July 1	8	13	16	6	Aug. 1
10	15	20	10	5	10	15	20	11	5	10	12	18	8	3	10	15	18	8	3
12	17	22	12	7	12	17	22	13	7	12	14	20	10	5	12	17	20	10	5
14	19	24	14	9	14	19	24	15	9	14	16	22	12	7	14	19	22	12	7
16	21	26	16	11	16	21	26	17	11	16	18	24	14	9	16	21	24	14	9
18	23	28	18	13	18	23	28	19	13	18	20	26	16	11	18	23	26	16	11
20	25	30	20	15	20	25	30	21	15	20	22	28	18	13	20	25	28	18	13
22	27	Nov. 1	22	17	22	27	Dec. 2	23	17	22	24	30	20	15	22	27	30	20	15
24	29	3	24	19	24	29	4	25	19	24	26	Jan. 1	22	17	24	29	Feb. 1	22	17
26	31	5	26	21	26	31	6	27	21	26	28	3	24	19	26	31	3	24	19
28	Jan. 2	7	28	23	28	Feb. 2	8	29	23	28	Mar. 2	5	26	21	28	April 2	5	26	21
30	4	9	30	25						30	4	7	28	23	30	4	7	28	23
May	April.	Feb.	Sept.	Aug.	June	May	Mar.	Oct.	Sept.	July	June	April	Nov.	Oct.	Aug.	July	May	Dec.	Nov.
1	5	8	29	24	1	6	11	30	24	1	5	10	29	24	1	6	11	30	24
2	6	9	30	25	2	7	12	31	25	2	6	11	30	25	2	7	12	31	25
4	8	11	Oct. 2	27	4	9	14	Nov. 2	27	4	8	13	Dec. 2	27	4	9	14	Jan. 2	27
6	10	13	4	29	6	11	16	4	29	6	10	15	4	29	6	11	16	4	29
8	12	15	6	31	8	13	18	6	Oct. 1	8	12	17	6	31	8	13	18	6	Dec. 1
10	14	17	8	Sept. 2	10	15	20	8	3	10	14	19	8	Nov. 2	10	15	20	8	3
12	16	19	10	4	12	17	22	10	5	12	16	21	10	4	12	17	22	10	5
14	18	21	12	6	14	19	24	12	7	14	18	23	12	6	14	19	24	12	7
16	20	23	14	8	16	21	26	14	9	16	20	25	14	8	16	21	26	14	9
18	22	25	16	10	18	23	28	16	11	18	22	27	16	10	18	23	28	16	11
20	24	27	18	12	20	25	30	18	13	20	24	29	18	12	20	25	30	18	13
22	26	Mar. 1	20	14	22	27	April 1	20	15	22	26	May 1	20	14	22	27	June 1	20	15
24	28	3	22	16	24	29	3	22	17	24	28	3	22	16	24	29	3	22	17
26	30	5	24	18	26	31	5	24	19	26	30	5	24	18	26	31	5	24	19
28	May 2	7	26	20	28	June 2	7	26	21	28	July 2	7	26	20	28	Aug. 2	7	26	21
30	4	9	28	22	30	4	9	28	23	30	4	9	28	22	30	4	9	28	23

GESTATION TABLE—*continued.*

Date of Service.	Due to Give Birth.				Date of Service.	Due to Give Birth.				Date of Service.	Due to Give Birth.				Date of Service.	Due to Give Birth.			
Sept.	Mare.	Cow.	Ewe.	Sow.	Oct.	Mare.	Cow.	Ewe.	Sow.	Nov.	Mare.	Cow.	Ewe.	Sow.	Dec.	Mare.	Cow.	Ewe.	Sow.
1	Aug. 6	June 11	Jan. 30	Dec. 25	1	Sept. 5	July 11	Mar. 1	Jan. 24	1	Oct. 6	Aug. 11	April 1	Feb. 24	1	Nov. 5	Sept. 10	May 1	Mar. 26
2	7	12	31	26	2	6	12	2	25	2	7	12	2	25	2	6	11	2	27
4	9	14	Feb. 2	28	4	8	14	4	27	4	9	14	4	27	4	8	13	4	29
6	11	16	4	30	6	10	16	6	29	6	11	16	6	Mar. 1	6	10	15	6	31
8	13	18	6	Jan. 1	8	12	18	8	31	8	13	18	8	3	8	12	17	8	April 2
10	15	20	8	3	10	14	20	10	Feb. 2	10	15	20	10	5	10	14	19	10	4
12	17	22	10	5	12	16	22	12	4	12	17	22	12	7	12	16	21	12	6
14	19	24	12	7	14	18	24	14	6	14	19	24	14	9	14	18	23	14	8
16	21	26	14	9	16	20	26	16	8	16	21	26	16	11	16	20	25	16	10
18	23	28	16	11	18	22	28	18	10	18	23	28	18	13	18	22	27	18	12
20	25	30	18	13	20	24	30	20	12	20	25	30	20	15	20	24	29	20	14
22	27	July 2	20	15	22	26	Aug. 1	22	14	22	27	Sept. 1	22	17	22	26	Oct. 1	22	16
24	29	4	22	17	24	28	3	24	16	24	29	3	24	19	24	28	3	24	18
26	31	6	24	19	26	30	5	26	18	26	31	5	26	21	26	30	5	26	20
28	Sept. 2	8	26	21	28	Oct. 2	7	28	20	28	Nov. 2	7	28	23	28	Dec. 2	7	28	22
30	4	10	28	23	30	4	9	30	22	30	4	9	30	25	30	4	9	30	24

OESTRUM (HEAT) PERIODS.

Animal.	Duration of Oestrum.	Return after Parturition.	Return if not Impregnated.
Mare	5-7 days	7-10 days	2-3 weeks or more
Cow	1 day	21-28 days	3-4 weeks or more
Ewe	1-2 days	4-6 months	17-20 days
Sow	2-4 days	5-6 weeks	20-21 days
Bitch	1-3 weeks	5-6 months	5-6 months

PULSE, TEMPERATURE AND RESPIRATIONS.

	Pulse Beats Per Min.	Respirations Per Min.	Temperature.
Horse	38-43	8-12	100-101°F.
Cow	50-60	12-16	101-102
Sheep	75-80	20-30	103-104
Pig	70-80	20-30	102-103
Dog	80-90	15-25	101-102

Problems of Wheat Growing on Central Eyre's Peninsula

[O. J. MURPHY, Warramboo (Poochera Conference).]

The fact that many hundreds on Central Eyre's Peninsula have an average wheat yield of 6 bushels per acre or less is an indication that these hundreds are not suitable for wheat growing or that the problems connected with the growing of wheat have not been solved successfully. It is not proposed to discuss the question of the economic side of a 6 bushel average, but to examine the problems confronting the wheatgrower with the object of determining the possibility of increasing the general wheat average.

The rainfall is light, seldom exceeding 14 inches, and in some years as low as 10 inches, but most of the rainfall occurs in the wheat growing periods. Temperatures show a big variation, being occasionally below freezing point in the winter months, and frequently exceeding the century in the summer. Frosts may occur during the winter and spring months. Spring is a comparatively short period. High temperatures and hot drying winds are experienced in September and October, in 9 years out of 10. Soil and climatic conditions have much to do with the growing of cereals, and the survey of soil conditions shows that these vary from light sandy soils to comparatively stiff, red ground. Much of the land is undulating—sand rises with intervening flats of reddish colour overlying porous, limestone sub-soil. Clay sub-soils are comparatively rare. It is obvious that the successful growing of wheat under such climatic and soil conditions presents some problems to the wheat grower. Soil and climatic conditions are not determined by the farmer, but the cultivation of the soil is. This aspect of the growing of wheat successfully cannot be too strongly emphasized. Once in a decade a season comes along, usually after a period of drought has killed out many weeds and plant diseases as well as the rabbit, when the wheat crop appears to flourish irrespective of the conditions under which it is sown; and farmers may be deluded into assuming that good cultivation is after all of little importance. On the other hand, when the average yield of any particular hundred is say 6 bushels, some farmers in that hundred will have an average of 10 to 15 bushels; and this is not always due to variations of soil. Good and poor quality soils are not separated by wire fences, or even by 3 chain roads. Surely it is wiser to judge the value of cultivation in a normal or subnormal season, rather than in a bumper season. It is essential that the wheat grower should study carefully the soil and climatic conditions under which he is farming before determining what cultivation methods he will use, what varieties of wheat he will sow, and when and how he will sow them. Every farmer should aim at making some contribution towards the problem of ascertaining what methods of cultivation and what varieties of wheat will give the best results over a period of years. As yet, we have not a standardised system of farming, such as exists in many of the older established districts on the main land, and until we arrive at a definite system and practise it generally, our wheat averages will remain below the average of the State.

One or two of the difficulties met by the wheat grower may be mentioned here with suggestions by the writer as to their possible solution.

The variations of our soils have been referred to. The heavier soils and the red flats carrying the heavier scrub and white mallee in the virgin state appear to be, and must eventually prove to be, our most productive wheat lands. Yet in practice it is frequently found that the returns from the heavier soils are disappointing—less than from the lighter soils of the sand rises, in spite of the fact that during the greater part of the season the crop on the heavier soil has been of greater density and better colour than that on the sand rise. Hot drying winds or possibly a late frost will have spoiled the denser crop. We cannot control the climatic conditions, and the only possible solution of this problem lies in cultivation, selection of wheat varieties and time of seeding. It is logical to suppose that the crop on the heavier soil must have reserves of moisture to draw upon, and must be at a stage of growth best calculated to withstand adverse spring conditions if it is to mature effectively. Fallowing, and early fallowing at that, is suggested as a first line of defence against adverse spring conditions. Not many farmers will discredit the value of fallow, but it must be completed in June and July under existing conditions, and we should not be satisfied unless the job is finished by the end of July. The crop too must be sown comparatively early—during May for preference, so that it may be well advanced by spring time. The sowing of fallow during the month of May under dry conditions would not be counted good practice in better rainfall areas of the State, but under our conditions the weed growth which may follow a dry sowing will take less toll of the crop than adverse weather conditions, if the crop is still in the young sappy stage in the spring time. Early varieties of wheat appear to be essential, and preference should be given to those carrying a minimum of flag, such as Gluyas. Bearded types of wheat warrant more attention, because the beard affords some protection against hot winds, and is of distinct value when late frosts occur.

Not all our problems will be solved in a generation, but there is obvious room for improvement in our methods. Seeding operations are carried out during the months of April, May, and July, and fallowing is not practised with the precision and tenacity that it warrants. Under the circumstances, a generally good wheat average cannot be expected.

Eyre's Peninsula has shown that it can produce a good export lamb, a good bacon pig and a champion wheat crop, and these achievements must eventually induce a greater proportion of its farmers to solve their difficulties successfully. Slip-shod methods are not good enough for the Eyre's Peninsula farmer. He can, if he will, plough as straight a furrow as any other.

Reports Received from Branches.

Dairy Cattle on the Farm.

[V. LEHMAN (Monarto South).]

The breed of cow must rest with the individual type of country, but for a district such as here the Milking Shorthorn and Jersey would be well suited, as they are types of cattle which do well in dry areas.

When buying dairy cattle it is best to purchase direct from a recognised breeder who will give some guarantee that they are sound; whereas if purchased at the various auction sales the cattle are what other people do not want. No man sells his best when culling his herd. Another point in buying dairy cattle is to try and buy heifers that are about to calve. In this way if there are any good producers one will have purchased them at a moderate cost, whereas if they have been tried out by the breeder and found to be good one may not have the chance of purchase.

Another method is to buy mature cows and breed up, but this takes time. Many persons who purchase pedigree stock, rear all calves, and keep on breeding from these even if they are below standard are really only multipliers of stock and not true stud breeders. To have any measure of success with dairy cattle one must cull everything which does not produce to a certain standard. Always procure the best bulls and feed your cattle so that they are able to give satisfactory returns. There is an old saying, "Half the breed is in the feed." No cow can produce at its best if turned out into a paddock to pick up its fodder when many times the feed is too short for such purposes. Here in this district we must handfeed to have the dairy cattle give of their best. I have proved year after year that hand feeding gave us back returns above the cost of feed and extra work which it requires. While in the Eastern States I visited a dairy farm which was milking 150 cows, and I was surprised to learn that the average production for the year was only 150lbs. of butterfat. On inquiring into methods of feeding, &c., I found that they only grazed their cattle, milked them twice a day for 6 months, and once a day for 3 months. When asked why not handfeed and keep half the herd, the answer was that dairy cattle were cheap, droughts came often, and if they lost many they were replaced cheaply, and handfeeding entailed too much work.

One of the best cereals for hay is oats. Oats are much better than wheaten hay, which has more of tendency to fatten a cow than it has for milk production. In addition to oaten chaff it is still advisable to feed crushed oats as a supplement. I have tried bran, but could not keep up the production of the herd even with big quantities; although bran during the dry summer months would be of help to the ration. If cows are grazed on top-dressed areas, this seems to help the cow keep up her condition, which means a lot to the cow during the cold winter months.

One of the main essentials to dairy cattle is regularity of milkings—that is, they should be milked at the same time morning and night, and one should not be always changing about. With regular milking one will not have any trouble with heavy producing animals stocking up unnecessarily. If one has the opportunity for having his herd tested it should be accepted, as this is the only means whereby one can be sure that each individual cow is doing its share; and if not it should be immediately culled out and for preference sold to a butcher. We should have some system whereby these culls are fire branded, and persons wishing to buy them do so at their own risk; otherwise we should only be passing cull cattle on and on.

The following are the main points for dairy cattle on the farm:—

Start with good stock.
Feed for production.
Test for production.
Cull to improve the herd.
Purchase good sires.

Kingston Bureau Field Day, 29th November.

Care of Farm Horses.

[L. K. RAMSEY (Roberts and Verran).]

The type of horse for working is the medium horse, with a few heavy horses for any heavy work. The first thing is a good stable and horse yard. A rail yard is the most suitable; or a stump yard is all right as stumps are plentiful in this district. Shelter over the horses' heads is necessary. Wire yards do not last and horses are liable to get their feet cut with wire. It is not advisable to have the horse trough in the yard as chaff will get in it from the horses' mouths. It is best to drive them to water outside the yard. Horses should be watered twice a day in winter and three times a day summer time when working. Before commencing work in the morning horses should be groomed, especially the shoulders. When working they should have spells at regular times, especially on sultry days. They will work better and it will not be necessary to force them. If horses have had a spell for a while they should be worked only a few hours each day until their shoulders harden in order to prevent sores. Mares should not be spelled when in foal but should be worked only lightly. If they are not worked they are liable to become over-fat and one may lose the mare. Yearlings should be fed in the yard with the workers; it not only makes them hardy, but when the workers are out they clean up all the rough feed and thus the workers get fresh feed when they come home. Young horses should be broken in from two to 2½ years of age. The best feed for horses is hay chaff. They do better on wheaten chaff than on oaten chaff. Long hay is all right for horses if the straw is not too coarse.

Activities of Women's Branches

ALAWOONA.

The annual meeting was held on 22nd October. Mrs. Jeffereys gave a report of the Annual Congress. Mrs. Cooper won the Scone Competition. A Household Hint Competition held on 17th November resulted in Mrs. Balnaves being awarded first prize. Mrs. Jeffereys read a paper on "Bread Making."

AUBURN.

Thirty-one members attended the October meeting, which was held at Mrs. Stephen's residence, who won the Scone Competition.

At a meeting held on 26th November Miss Maddern read a paper, "Floriculture." Mrs. Stephens won first prize in the Flower Competition.

BALHANNAH.

Casserole Cooking.

At the suggestion of the Balhannah Branch, the following recipes of casserole cooking which were given at the October meeting are printed in the hope that they may be useful to other members:—

Curried Lamb Chops.—Put 1oz. of butter in a casserole, melt it, then add ½oz. of each of flour and curry. Mix and let it colour slightly, put in a pint of milk or water, let it come to boil, and put in chops which have been lightly browned. Cook in good oven 1 hour, then add a few mushrooms and simmer until tender.

Rabbit en Casserole.—Soak a young rabbit in salted water for some time, dry well, and cut into joints and dust with flour. Put 2ozs. of butter in casserole and fry in it 4 small onions, some sprigs of thyme and parsley, and bay leaf with some fat bacon cut in slices. When onions have browned, put in the pieces of rabbit, add ½ wineglass of sherry and a gill of stock and cook slowly until tender —about 2½ hours. Remove parsley, thyme, and bay leaf, and serve in the casserole.

Jarrel Steak.—2 tblspns. each flour and sugar, ½ tspn. each pepper and salt, 1 large cup water, 1 tblspn. vinegar, 1 dspn. of Worcester sauce. Mix dry ingredients together and rub well into steak on both sides, put in pie dish and pour the water, etc., mixed together. Let it stand 1 hour, and bake in moderate oven 1½ hours. This is for 2lbs. of steak.

Pork Chops en Casserole.—1½lbs. pork chops, ¾lb. apples, 1 onion, 1oz. each dripping and flour, ¾ pint water, salt and pepper. Peel, core, and slice apples, put into casserole, mix salt and pepper with flour and roll all chops in this. Fry onion in dripping, then add to apples. Lightly brown the chops and place them over onions. Add flour to dripping in pan, blend well and add water, bring to boil and pour over chops. Put lid on casserole and cook in moderate oven 2 to 3 hours.

Savoury Steak.—1lb. bladebone steak, 1 tspn. salt, ¼ tspn. pepper, 1 tspn. sugar, 1 tblspn. each flour, vinegar, and Worcester sauce, 1lb. tomatoes, ½ grated nutmeg. Mix flour, pepper, salt, and nutmeg together, rub into steak. Place in casserole and sprinkle remainder of flour on it. Mix other ingredients and pour over and cover. Cook in slow oven for 2 hours.

Mrs. E. Mattner gave a talk on a recent visit to Western Australia at the meeting held on 17th November. (Secretary, Mrs. Grow.)

BALUMBAH.

The fifth Annual Banquet of the Branch was held on 24th October. (Secretary, Miss D. Jericho.)

BEETALOO VALLEY.

Miss Rice read a paper, "Child Psychology," at the October meeting, and on 22nd November a paper on "Christmas Gifts" was read by Mrs. Pearce. (Secretary, Miss L. Pearce.)

BELALIE.

Members met at the homestead of Miss M. Veale for the November meeting. The Christmas meeting was held on 14th December, and was attended by 38 members. Gifts of home made sweets were handed in for the Jamestown Hospital. (Secretary, Mrs. E. L. Orchard.)

BOOR'S PLAINS.

Mrs. N. Cross presided at the November meeting. Congress reports were given and officers elected for the ensuing year. (Secretary, Miss L. Stanway.)

CLARE.

"Interior Decoration" was the subject of an address given by Mr. Gooden on 6th November.

Novelties and gifts suitable for Christmas were displayed at the December meeting. Mrs. McKendrick was the successful exhibitor in the biscuit competition. (Secretary, Mrs. A. Pollock.)

COONALPYN.

An instructive paper, "Curing Meat," was read by Mrs. Barrie at the October meeting. (Secretary, Miss E. George.)

COONAWARRA.

A garden party was held at Mrs. H. Reschke's homestead on 22nd October.

On 24th November a talk on "Casserole Cooking" was given by Mrs. W. Redman. Mrs. L. Tiechelman spoke on "Bread Making," and Mrs. W. Pounsett gave useful hints on baking bread by the compressed yeast method. Twenty-nine members and several visitors were present at the December meeting to hear Dr. Oaten speak on "The Life and Work of Louis Pasteur." (Secretary, Miss O. Lear.)

ECHUNGA.

An American Afternoon in aid of the Flying Sister Fund was held on 7th October and on 3rd November members finalised arrangements for the Annual Social. (Secretary, Mrs. F. Dennis.)

GEORGETOWN.

Mrs. J. A. Lyons gave members a talk on her recent trip overseas, and officers were elected for the next 12 months. (Secretary, Mrs. E. Buckenara.)

GLADSTONE.

Members journeyed to Wirrabara on 21st October and held a homestead meeting on the property of Mr. C. Curnow. (Secretary, Miss M. Lines.)

HOPE FOREST AND DINGABLEDINGA.

Mrs. Caw, a visitor from Western Australia, addressed members at the November meeting, and the annual meeting was held on 5th December. (Secretary, Mrs. M. Schroeder.)

KANGARILLA.

Recipes and samples were brought along by each member at the October meeting. (Secretary, Mrs. M. Steer.)

KARTE.

A combined meeting of both Branches was held on 14th October at Mrs. Freeman's home. The hostess read a paper on "Bread Making." The Secretary (Mrs. Atze) advises that the Annual Exhibition will be held on 30th March.

KOOLUNGA.

The final meeting for the year was held on 18th November, and took the form of a social afternoon, 33 members and 20 visitors from Snowtown and Narridy being present. For the last three months the Branch has conducted a competition for the best paper on each of the three following subjects:—(1) "Women in Public Affairs," (2) "Qualities of a Good Hostess," and (3) "Careers for Girls." The paper awarded first prize in each section has been selected for publication.

Women and Public Affairs.

Read by Mrs. J. Sykes—Women's interest in problems that affect the whole community is to be welcomed, for it is the duty of all responsible citizens to acquaint themselves with the vital doings around us. Thanks to the daily papers, the radio, and greater association with one another, we take a keener interest in life outside our homes. Women who are interested in public life have a wider and a happier outlook, and, therefore, happier homes; for variety is the spice of life. We should train ourselves to think deeply, sometimes our impressions are of a sketchy nature, we must wake up, get a good grip of things and must not be afraid to voice our opinions. We should welcome responsibility and be youthful in the freshness of our enthusiasm. No movement can thrive without enthusiasm.

The justification of one's existence is the work we can show which in one way or another has been of benefit to others. There is little difficulty in finding opportunities to take part in public life. Are we satisfied with our schools in the country? Are our children enjoying the same advantages as city children? Women can do much by working to improve conditions and making additions. What about a Domestic Arts class for our school? Are we satisfied with our streets, our public buildings, libraries, &c. Have we adequate social entertainment for young and old? Let us ask ourselves what we are doing to improve our town. Let us stand behind our sporting clubs and give them our enthusiastic support. Women do not shoulder responsibilities of work of a public nature for the mere pleasure they get out of it—there are easier ways (if more selfish) of enjoying oneself. It is the urge of duty and the satisfaction they get out of it for having done something worth while. There are thousands of public spirited women who work very hard for the good of their mankind. Hats off! to these women, may they keep the flame of intellectual interest alive and make the world a better place to live in. Let us unite as a great body of women—shoulder our responsibilities, take the keenest interest in public affairs, and give our fullest sympathy and strongest support to any movement, be it for the good of our community or to help along the more unfortunate ones in our midst. May the mother who strives to mould strong and fine characters in her sons and daughters inspire them with the desire to become enthusiastic public spirited citizens.

Afternoon Tea, Penola Bureau Field Day.

The Qualities that go to Make a Good Hostess.

Read by Mrs. H. Jones—Modern transport plays an important part in our lives to-day. The advent of the motor car and aeroplane, electricity and telephone, and other modern conveniences which go to make our lives and homes more comfortable, distance is no object, enables us to keep in close touch with all our friends, and is responsible for the relationship with visitors from all parts of the Empire, thus resulting in much entertaining.

Every woman loves to entertain and be entertained. For the woman with original and individual ideas there is no limit, and the wise hostess knows that if she wants to achieve success as a popular hostess, she must give of her very best in order to ensure a successful entertainment.

Naturally, a hostess likes to make a success of her functions, therefore she realises that she must provide something just a little different, something novel in the way of decoration, &c. Fashions in decorations for these entertainments change as quickly as a dress fashion, and to keep up to date with these changes it is necessary for a hostess to be on the alert for new ideas, straining every effort, and sparing no expense to give her guests the utmost in entertainment.

It is not necessary to plan on an elaborate scale. That, of course, depends on the circumstances and position of the guests you are honouring. Simplicity is always appreciated.

If entertaining in your own home, see that all the appointments and setting are attractive. The table linen spotless and dainty, and when introducing the guests, set them at ease by placing them with the right people, thus making everybody feel that he or she has an interest in some way or another. Never allow your guests to feel bored. If your guests are staying for the night, see that the guest rooms and beds are well aired and a fire lighted, if necessary, and the linen spotless and fresh. A few good books would be appreciated and a vase of flowers arranged in the room is a kindly gesture which would not fail to please the guests.

It is nice to feel that welcome which only a hostess can give who uses tact and courtesy, combined with a pleasing personality and genial manner.

Careers for Girls.

Mrs. J. W. Sykes presented the following paper:—The mother who is fortunate enough to have a daughter, or several daughters, has an interesting time ahead. The girl who has been well brought up is doubly fortunate if her mother still stands at the helm to guide her. It is a mistake to overcrowd a girl's life; home tasks certainly help morally to develop unselfishness, but too many of them take up too much of their time and detract interest for the work on which the girl wishes to specialize.

When a girl is deeply interested in some work or play it is wrong to call her away to do some trivial task. Parents must analyse their daughters's desires, in some cases mothers are prone to select for their daughters to suit their own taste rather than the needs of the girl—they are just a little too domineering, which will cramp individual expression.

Every girl is entitled to lead her own life; it is the mother's privilege to instruct her where in life she will find most happiness. If a girl wishes to stay at home and help in the family circle, that is often very convenient for all concerned, she may study music, singing, elocution, dancing, art, or literature, or any subject that may appeal to her amidst happy and contented surroundings. A girl must not dabble in too many hobbies—she can easily become "Jack of all trades and master of none." A solid education is essential to every girl, whether she stays at home and learns the arts leisurely or takes up a profession seriously. Find out what your daughter plans to do and leave no aspect of the subject unlearned. Kindle an interest in the girl's favourite hobby and the things she excels at. The girl who wishes to be independent and to take a career seriously will use every opportunity to fit herself for her job. If the parent is also ambitious for her girl, she will give every help and encouragement.

It is sometimes necessary for both mother and daughter to make sacrifices if the girl is to become really successful in the profession she has chosen. In some cases years of hard work and much expense are necessary to fit her for the work; and no sacrifice is too great if the girl is going to make a success of her career. It is surprising how obstacles are surmounted if you have grit and perseverance enough, and nothing is worth having unless we have worked and, if need be, suffered for it.

Many professions are available, all of which are full of interest; there is music, singing, dancing, physical culture, art, designing, interior decoration, secretarial, teaching, and a host of others. There are many branches of work included in domestic science that the average girl can specialize in, and it is a training which will be useful to her should she one day marry.

Most girls enjoy cooking, and it is very necessary to be able to cook food well and to have a knowledge of food values.

To be a teacher of domestic arts would make a very interesting profession. Other work for those with a domestic science training is that of demonstrator and saleswoman for the gas and electricity appliances for cooking and household work. Whatever career a girl chooses she must be sure she is suited for it, she must be properly trained and must find a joy and delight in putting her best into it for the sake of work well done rather than the monetary value it means to her. (Secretary, Mrs. T. Whitehorn.)

KYBYBOLITE.

At the November meeting, Mrs. W. C. Johnston read a paper, "Dahlia Growing," and demonstrated how to prepare a tuber for planting. Miss C. McInnes spoke on a trip overseas, and exhibited photographs of countries she had visited. The December meeting was devoted to the reading of suggestions for Christmas gifts. (Secretary, Miss M. Moore.)

LAURA BAY.

Curing Bacon.

Congress reports were read at the October meeting, and on 9th November Christmas novelties were displayed. The following paper was read by Mrs. E. Bowell:—The usual time for curing bacon on farms is during the months of May, June, July, and August. The pig should weigh from 80lbs. to 120lbs. or 150lbs. After the carcass has been cut into suitable pieces, hams trimmed, and bacon boned, also the round bones taken out of the hams; if these are left in they will taint the meat; rub well with plain salt, and pack into a cask. Have a board raised about 2in. in the bottom of the cask to allow for drainage. Place all the pieces of meat in, flesh side up. Next morning take it out and drain the cask. Rub the meat with a mixture of 10lbs. salt, 3lbs. or 4lbs. of brown sugar (white will do), and ¾lb. saltpetre well mixed. There will be some mixture over, keep it, and rub more in every alternate day, when you change the positions of meat in the cask. See that the salt mixture is well pressed around the bones in the hams. Some people take all the bone out of hams and sew them into shape again. Half sugar and half salt and 6ozs. of saltpetre is also a good mixture. The sugar keeps the meat soft. A handful of carb. soda rubbed into the lean meat on bacon also keeps it from geting too salt and dry. Turn and rub the meat every other day for 10 days at least. The bacon should be cured in 2 weeks, hams and shoulders in 3 weeks—depends on the size and the way it is curing. Wash and dry the bacon and hang up, or smoke it first. Put hams into thin calico bags and hang in a cool place to dry. The meat of the cheeks and trimmings makes good sausages. Put all through the mincer, then force into skins. The seasoning mixture we use is—2ozs. each thyme and salt, 1½ozs. pepper. Mix together and put 3ozs. of this to 10lbs. minced meat and 1 loaf of bread soaked in cold water and squeezed not too dry. If liked ½oz. mace, ½oz. ginger, 1oz. of allspice can be added.

Household Hints.

The following were given by Mrs. E. Barnett:—

If pressed for time when boiling a plum pudding, roll the mixture in a cloth as for roly-poly and tie at both ends. It will cook in half the time.

Strain left-over tea into bottles, add 1 tspn. of glycerine to each pint of tea and you have an excellent window cleaning fluid which will also keep flies off the glass.

Always add a pinch of salt to eggs and sugar before beating them. It makes them lighter and lessens the beating period.

This also applies when beating the white of an egg or an egg-flip.

If eggs are short, 1 tblspn. of golden syrup in a cup of warm milk equals 3 eggs. Golden syrup used in a pudding will serve the purpose of sugar, eggs, and milk, and will keep it moist.

To sweeten rancid fat, melt it as if for clarifying, then drop a piece of crisp brown toast into the melted fat and leave for 5 minutes. The bread absorbs the rancidity and the fat can then be used for any cooking.

To remove iron-rust from linen, boil some rice and soak the stained material in the water for about 4 hours.

A leaking tub will be as good as new if the hole is filled with putty or soap and the tub given two coats of aluminium paint on the inside. Will not come off in the wash.

To mend a hole in roof, tub, &c., paint the hole first with any kind of old paint and while it is wet dab putty on; it sets like cement.

Beat an egg-white to a stiff froth and whip with the juice of a lemon; 1 tspn. taken every hour will relieve hoarseness and coughing. (Secretary, Miss R. Blumson.)

MALTEE.

The Sponge Cake Competition held on October 14 was won by Miss R. Talbot. On November 11, Miss N. Schwarz read a paper, "Lemons and their Uses." Miss L. Schwarz (Secretary) was awarded first prize for the best Christmas novelty.

McLAREN FLAT.

Mr. F. Wilson gave a travel talk at the November meeting. Mrs. I. Dyer exhibited the best sponge roll. Three new members were enrolled. Miss Sharman spoke on the preparation of cakes, &c., for exhibition on December 2, and Mrs. Bert Elliott won first prize in the sponge sandwich competition. (Secretary, Mrs. S. Elliott.)

Belalie Women's Homestead Meeting, November, 1937.

MILANG.

Mrs. J. McCarthy displayed a collection of the wild flowers of the district and explained the method of classifying and identifying flowers and plants. (Secretary, Miss R. Whitfield.)

MILLICENT.

Reports of the Adelaide Congress were given at the October meeting and on November 8 Miss E. Campbell of the Education Department addressed a large attendance of members and visitors on "Food Values" and "The Uses of Wool." (Secretary, Mrs. L. Redman.)

MONARTO SOUTH.

Miss Strauss and Mrs. F. Liebelt (Secretary) judged the Sultana Cake Competition on October 19 and made the following awards:—First, Mrs. P. Hocking and second, Miss E. Hein.

MURRAMINGA.

Mesdames Kies and Roberts read reports of the Annual Congress at the October meeting and members exchanged recipes. (Secretary, Mrs. F. Roberts.)

MYPONGA.

At Mrs. Magor's homestead on October 21 members met and exchanged recipes for Christmas cooking. (Secretary Mrs. M. Boundy.)

NARRIDY.

Twenty-six members combined with the Men's Branch on November 6 to hear Mr. J. A. Lyons, M.P., speak on his recent trip to England, Canada, and the United States of America. (Secretary, Mrs. H. Siviour.)

NELSHABY.

Members of both Branches held a meeting on October 15 when Mr. J. A. Lyons, M.P., spoke on his recent trips overseas and on the 23rd Congress reports were discussed. (Secretary, Miss A. Lawrie.)

O'LOUGHLIN.

"Knitting" was the subject of a paper read by Miss V. Kloeden at the meeting held on October 21 at Mr. C. Kloeden's homestead. (Secretary, Mrs. A. Kloeden.)

OWEN.

Miss A. Harkness had charge of the final meeting for the year which was held on November 11 and took the form of a social afternoon. (Secretary, Miss D. McPharlin.)

PARRAKIE.

Sixteen members and four visitors attended the October meeting when a Question Box afternoon was held. (Secretary, Miss L. Beelitz.)

PENOLA.

Twenty-nine members and visitors attended the October meeting to witness Mrs. Barclay of Port Augusta give a demonstration of women's handicrafts. Mrs. Barclay exhibited a collection of beautifully worked articles. Members were particularly interested in the new method of rug making which Mrs. Barclay demonstrated. (Secretary, Miss H. Marks.)

PINNAROO.

Mrs. J. Langford gave a demonstration of preserving vegetables. The Branch expresses its appreciation of a gift of 12 preserving jars from the Vacola Company. (Secretary, Mrs. M. Wirth.)

Ropy Bread.

Asked by the Warcowie Women's Branch of the Agricultural Bureau "How to prevent ropiness in bread?" the Director of Chemistry, Mr. C. E. Chapman says:—"The first indication of ropy bread is a very slightly fruity smell in the loaf, but the odour rapidly becomes marked and unpleasant, while the crumb itself shows brownish, soft and sticky spots.

Warmth is necessary for the development of 'rope,' which is usually encountered in hot weather, and the following precautions will be found of value for controlling it:—1. Cool the bread as rapidly and as effectively as possible. 2. Use vinegar or acid calcium phosphate in making the dough. Vinegar is usually incorporated at the rate of 1 to 1¼ pints per 80lbs. sack and acid calcium phopshate 2lbs. a sack. Note.—*B. mesentericus*, the rope bacillus, cannot live in the presence of acid. 3. Use cool doughs, but do not stint the yeast; and ensure very vigorous fermentation, since the more vigorous the fermentation the less likelihood there is of the bacteria thriving.

If rope appears, disinfection is essential. Get rid of all old dough and bread, which should be burnt. No decaying dough must be left about. Scrub down with vinegar all troughs and tables, &c. Do not allow the loaves to be stacked close together, as this slows down the rate of cooling, and thus gives the organisms a chance to multiply. Rope spores may be found in the ingredients other than the flour; such as the yeast or malt extract.

If attention is paid to the precautions and instructions mentioned above, it will be found possible to eliminate the trouble."

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All communications to be addressed:
"The Editor, Journal of Agriculture, Education Building, Adelaide."

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A. P. BLESING, *Minister of Agriculture*

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Agricultural Bureau Conferences, 1938

Lower North, at Lyndoch, 24th February (W. Georg, Rosedale, and J. S. Hammat, Williamstown).

Yorke Peninsula, at Port Victoria, 2nd March (G. H. Bittner, South Kilkerran).

Mid-North, at Narridy (Conference postponed).

South-East (Upper), at Mundalla, 23rd March (A. Ross, Mundalla).

South-East (Lower), at Robe, 13th April (F. H. Banks, Robe).

Each Conference will commence at 10.30 a.m. Papers and questions for the agenda of any Conference should be submitted about a fortnight before the date on which it will be held.

Agricultural Shows

We have been advised by Secretaries of Agricultural Show Societies that their shows will be held on the following dates:—

Mundalla, Wednesday, 9th March, 1938.
Mount Pleasant, Thursday, 17th March, 1938.

Overseas Wheat Quotations

By courtesy of the New South Wales Marketing Bureau, the South Australian Department of Agriculture is supplied regularly with statements showing overseas quotations for wheat to the nearest eighth of a penny. The accompanying table gives weekly quotations in the State or country of origin of the wheat, and months of shipment or delivery.

Date of Quotation.	Values Elsewhere than in Sydney are Expressed in English Currency.							
	S. Aus. Wheat.	W. Aus. Wheat.	Manitoba No. 3 Wheat, ex Vancouver.	Argentine Wheat.	Karachi Choice White Wheat.	American Hard Winter Wheat, ex Gulf Coast.	White North Pacific Wheat.	
1938.	Jan.-Feb.	Jan.	Feb.	Jan.-Feb.		Jan.	Jan.	
	s. d.	*s. d.*	*s. d.*	*s. d.*	*s. d.*	*s. d.*	*s. d.*	
Jan. 20...	4 9	4 7¾	5 7⅛	5 6⅝	—	5 2⅝	4 7⅛	**Victoria parcel (March) at 4s. 9d.**
Jan. 27...	4 8⅝	4 8¼	5 7½	5 4¼	—	5 1⅜	4 6¾	
	Feb.-Mar.	Feb.	Mar.	Feb.-Mar.		Feb.		
Feb. 3...	4 8¼	4 7⅞	5 7⅞	5 0¼	—	5 0¼	—	**New South Wales—Cargoes (Feb.) at 4s. 7⅝d. and 4s. 7½d. Victoria—Parcel (April) at 4s. 7⅞d. South Australia—Feb. Shipments at 4s. 6¾d., March at 4s. 7½d.**
		Apr.	Mar.	Feb. Mar.	May-June.			
Feb. 10...	—	4 7⅞	5 8¼	5 6⅛	4 6¾	—	—	**Victoria—Parcel (March) at 4s. 7⅜d.**

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Progressive Centennial Development of the Pastoral and Agricultural Industries of South Australia, 1836—1936

[By ARTHUR J. PERKINS, O.B.E., Life Member of the Advisory Board of Agriculture and of the Agricultural Bureau, Chairman of the Governing Council of the Roseworthy Agricultural College, sometime Director of Agriculture (1914-1936), Principal Roseworthy Agricultural College (1904-1914), &c.]

(*Continued from page 537.*)

THE FIRST DECADE, 1836-1846.

CHAPTER XI.

The Flaxman Surveys—Their location and description—How Flaxman forestalled John Morphett in their acquisition—Angas rebukes Flaxman for his Land Speculations—Angas' character—Angas strongly resents unauthorised drafts by Flaxman on him—Flaxman's early neglect of his Mercantile House—The case of James McLaren—Angas' determination to refuse acceptance of Flaxman's drafts—Arrival in Adelaide of Edward Rowlands—His early association with Joseph Gilbert and George Miller in the Wiltshire Special Survey—Dissolution of partnership—Flaxman returns to England—Refusal of South Australian Company to accept Flaxman's Surveys from Angas—Angas suddenly decides to retire the drafts—Arrival of Flaxman in London—Protracted negotiations with Angas over the seven Special Surveys—The Manchester Agreement—Flaxman's subsequent refusal to implement it—Acceptance of arbitration by both parties—Return of Flaxman to South Australia—Controversies resumed with Anthony Forster—Affairs of Flaxman and Rowlands placed in the hands of Trustees.

It was proposed to treat as a single unit the seven Special Surveys, details of which would be given below, owing to the peculiar circumstances that attached to their ultimate acquisition, and to the fact that in the aggregate they stood out as a single and tolerably homogeneous block, the choice sections of which for the most part came eventually under the ownership of a single individual—George Fife Angas. The essential unity of these seven surveys seemed to have been apparent from the outset, when they were currently known by the name of the man, who had originally selected them, who had perhaps aspired after ownership of them, and in whose name at all events they had all been officially registered, namely, the "*Flaxman Surveys.*"

The original definition of the first two of these seven Special Surveys—*i.e.*, the twelfth and thirteenth or Nos. 22 and 23 of Map No. 1 (4)—was as followed: "Charles Flaxman, 8,000 acres on the 26th April, 1839, for £8,000, described as follows: the valley on the west, north-west, north, north-east, and east sides of the Barossa Range of hills, including the river recently discovered by the Germans and named the 'Flaxman River' (1) and Light's Pass at the northern extremity of the Barossa Range. The survey to begin six miles, or thereabouts, to the north of the South Australian Company's Special Survey in Lyndoch Valley. (2) Later on, however, when the fifteenth Survey—*i.e.*, No. 24 on Map No. 1—came to be claimed on the 4th May, 1839, the three Surveys were brought under one common denomination as followed:—12,000 acres from a compact district of 45,000 acres "in the valleys skirting the Barossa Range, on the west-north-west, north, and east sides, including *Light's Pass,* at the northern extremity of the Barossa Range." (3)

Similarly the next three Special Surveys within this group, namely, the twentieth, twenty-first, and twenty-second—Nos. 25, 26, and 27 of Map No. 1—were taken jointly on the 20th May, 1839, and described as 12,000 acres from "three compact districts of 15,000 acres each in the country lying to the eastward of Flaxman Valley (1) (on the eastward side of the Barossa Range) and stretching round to the north of *Light's Pass.*" (5) The twenty-third Special Survey and the last of the *Flaxman Surveys*—No. 28 on Map No. 1—was taken on the same date, namely, 20th May, 1839, and described in the following terms: "a compact figure containing 15,000 acres in the country lying to the west and north-west of the western end of *Light's Pass.*" (5)

Hence, in a district specially favoured in the matter of rainfall, there were some 105,000 acres of land in a single compact block, for which the claimer of the seven Special Surveys had paid into the Colonial Treasury, the sum of £28,000 in cash, or its equivalent in Land Orders; and from which so soon as the surveys would be completed, he would have the right to select the 28,000 acres most to his liking; and as many additional acres as he would care to pay £1 for, during the course of the first fortnight immediately following the official declaration that the surveys of the area in question had been completed: thereafter, the balance of the unselected land—frequently of very little value—would be thrown open for application by the general public. In the circumstances, assuming availability of both requisite funds and suitable land, the temptation to secure all the good land within reach must have been great upon the original claimant, so long as land prices which the public was prepared to pay for immediately available land, showed a sufficient margin of profit above £1 per acre.

In order to convey as much as possible a clear understanding of the geographical position of these seven Special Surveys, they have been projected with others, through the courtesy of the Survey Department, upon a modern map—Map No. 2—on which the descriptive details that followed would be found.

(1) See Appendix XVI.: The Flaxman River.

(2) *South Australian Gazette and Colonial Register,* 27th April, 1839, page 1, cols. 4 and 5.

(3) *South Australian Gazette and Colonial Register,* 11th May, 1839, page 1, col. 3.

(4) See February, 1937, issue of this *Journal.*

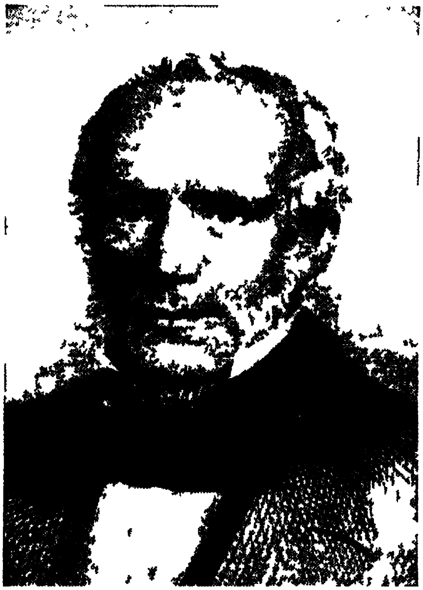
(5) *South Australian Gazette and Colonial Register,* 25th May, 1839, page 1, col. 1.

If from the *north-west corner* of the block of land in question—about one and a half miles south of Greenock which lay therefore without the Surveys—we proceeded along its northerly boundary line, we should find the latter to extend 17 miles in a north-easterly direction; and during our progress along it we should successively pass by Nuriootpa—the old Angas Park—and Light's Pass, both respectively about one mile south and therefore within the seven Surveys; Stockwell actually seated upon their northerly boundary line; and Truro, half a mile south, and therefore also within them. On reaching the *north-east corner* we should find that the easterly boundary line, instead of proceeding definitely in a southerly direction, began by developing a "bulge" by dipping two miles southwards, and then returning four miles westwards; but thereafter proceeding more or less regularly in a south-easterly direction, during the course of which it would successively pass by Keynes' Station—about four miles east and therefore without the seven Surveys; Moculta—about four miles west, and therefore within them; and Towitta—about one mile east, and therefore without them. From the *south-east corner* the boundary proceeded irregularly in a south-westerly direction—passing about half a mile to the north of Mons Hill—without; two and a half miles south of Keyneton—within; half a mile east of Eden Valley—within; and reaching the south-west corner about half a mile off Mount Crawford—without. The westerly boundary was very irregular in outline: it started in a northerly direction, following the South Para River to its sources, and thereafter Jacob's Creek to the latter's entrance into the Special Survey of Gilbert and Rowlands—No. 21: from thence onwards except for two miles immediately to the south of the *south-west corner*, from which we started, the westerly boundary of the seven Surveys, merged in the southerly, easterly, and northerly boundaries of the Special Survey of Gilbert and Rowlands.

Bethany—A Village of German Settlers.
[*Plate* 68.] (From *South Australia Illustrated*, by Geo. French Angas.)

The struggle for what ultimately became known as the "Flaxman Surveys" gave rise from the outset to some dramatic moments: and the successes—if such they must be termed—that early befell Charles Flaxman in the matter, were no doubt due in part to native shrewdness and tenacity of purpose, but nevertheless overwhelmingly to astounding audacity, supported by an undoubted touch of megalomania. These points should be borne in mind, because they would probably be recalled later on when the attempt would be made to explain that baffling enigma that was Flaxman. From available data the improbability of Flaxman's means being at the time sufficient to meet the cost of a single Special Survey, let alone seven, could easily be shown, and whatever credit he could orginally have claimed as a confidential agent of G. F. Angas would probably have been exhausted by the calls of the indifferent "Meadows" Special Survey, which with the assistance of others he had taken up towards the end of January, 1839. Nevertheless, notwithstanding the danger, he greatly dared; and as sometimes happened in such cases, he seemed at first to have succeeded: but these were matters which would receive special consideration later on.

It appeared that the important tract of country, subsequently to be included in these seven Special Surveys—and with it an unknown river, said to have been "the finest sheet of water yet found in the Colony, except the Murray"(6)—had been accidentally stumbled upon by a roving band of German emigrants, who in gratitude to the man who had befriended them in an alien land had called the latter the *Flaxman River.*(7) As soon as Flaxman heard of this promising discovery, he set out with characteristic promptness to examine and confirm it: "the examination, hasty survey, and purchase only" occupied "thirty-six hours."(6) So said the *Southern Australian*: but David McLaren, who was more or less in Flaxman's confidence in the matter, had left us fuller details, given with the zest of a man who, himself having been twice outwitted, found it not unpleasant to chuckle over corresponding misfortunes of his friends. "When I last wrote you," he said "several parties were out on the business of Special Surveys, namely, Mr. Morphett, attended by Mr. Samuel Stephens; Mr. Cock, land agent, for a company in town; and Mr. Gilbert, from the *Buckinghamshire* attended by Mr. Hallett. Mr. Morphett went overland beyond the head of St. Vincent's Gulf—much the same road as I took in January last—but he saw no place of sufficient value till he came to the neighbourhood of Lyndoch Valley beyond the Barossa Range. To that same spot Mr. Flaxman had gone on account of G. F. Angas and himself; and having observed Mr. Morphett and his party, unperceived by them, he immediately took horse, rode all night, arrived here on the morning of the 26th ultimo"—April—"immediately secured two Special Surveys; and that evening Mr. Morphett and Mr. Samuel Stephens arrived and found themselves forestalled. I am happy that a property of which reports speak so highly, has fallen into the hands of Mr. Flaxman and Mr. Angas; the only doubtful point is whether one Survey might not be better than two."(8) But Flaxman, although equally inexperienced in land matters, had none of McLaren's



George Fife Angas (1789-1879), First Chairman of the South Australian Company and prominent pastoralist and merchant.
[*Plate* 69.]

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(6) *Southern Australian*, 1st May, 1839, page 2, col. 5.
(7) See Appendix XVI: The Flaxman River.
(8) David McLaren to E. J. Wheeler, 3rd May, 1839.

hesitant timidities. "Mr. C. Flaxman who went last week to examine more fully the country in the range of the Barossa Hills, returned on the evening of the 3rd instant"—May—"and has since claimed another Special Survey there on account of G. F. Angas and himself. The funds for the three Special Surveys have been obtained by our"—*i.e.*, the Company's Bank—"negotiating his drafts on G. F. Angas. As Mr. Flaxman had no express orders from Mr. Angas for these purchases,(⁹) it may be that Mr. Angas may not wish to take all these to account. Should he not do so, I have no hesitation in saying that I think it would be for the interest of the Company, to take whatever portion of them he may decline. I have not seen the land which Mr. Flaxman has chosen, but I believe it is very excellent and might at once be sold here at a premium of 50 per cent."—a premium much below Flaxman's fond imaginings—"but what price—if Mr. Angas be disposed to part with any portion of it—he may ask, or the Board think proper to give I cannot pretend to say . . . . Mr. Flaxman has started again to-day"—*i.e.*, 6th May, 1839—"for the country to the same quarter as formerly, and intends to examine the neighbourhood for one or two more Special Surveys. I proposed combining the Company's interests and Mr. Angas', but he thought proper to decline."(¹⁰)

Curiously enough, these seven Special Surveys that eventually helped to lift G. F. Angas from a commercial Slough of Despond into which he had been cast in part by an over-indulgence of philanthropy,(¹¹) and from which in due course the worldly greatness of his house was to spring, had but a cool reception when first brought under his notice. True, the circumstances were peculiar, perhaps unprecedented: and the outlook for immediate profits hardly encouraging. These lands, as we had already occasion to note, had been somewhat hastily selected by Charles Flaxman; paid for with funds supplied by the South Australian Company's Bank—which institution, in the firm belief that Angas' accredited confidential agent was not likely to err in such a matter, readily discounted Flaxman's drafts on Angas for immediate payment of the cost of Survey—but every acre of such Surveys was officially registered in Flaxman's own name, and in the eye of the law he was the ostensible proprietor of every acre thereof. These circumstances alone should have sufficed to warrant some degree of hesitancy on the part of the Bank officials, particularly as it must have been known to them that Flaxman had not been commissioned by Angas to purchase land on the latter's behalf. Indeed, at the time Angas had no thought of becoming a landowner in a large way in South Australia; trusting rather for his livelihood to commerce and shipping—buying and selling and conveying—with which he had been familiar from his youth upwards. "If I had chosen" he wrote by way of rebuke to Flaxman, "to speculate largely in land in South Australia, I had both the opportunity and the means long before, but my desire was rather to do good than to grow hastily rich; and this was an example that you might safely" have followed.(¹²) In order to unravel the position and make clear the difficulties with which Angas found himself confronted, it was necessary to cast a backward glance over some of Flaxman's earlier doings.

Prior to his departure for South Australia in charge of 200 German emigrants aboard the *Prince George*, Charles Flaxman, who spoke German "as well as his native tongue" had been nine years in the employ of G. F. Angas'

(⁹) It should be observed that on his own admission, McLaren was aware that "Flaxman had no express orders from Mr. Angas for these purchases": in the circumstances, notwithstanding the fact that McLaren recognised Flaxman as Angas' confidential agent, it was remarkable that the former, as Manager of the South Australian Bank, should have consented to discount unauthorised drafts on Angas, not for three only but for seven Special Surveys—drafts which Angas eventually contemplated dishonouring.

(¹⁰) David McLaren to E. J. Wheeler, 6th May, 1839.

(¹¹) See *George Fife Angas*, by Edwin Hodder, 1891—Preface.

(¹²) George Fife Angas to Charles Flaxman, 16th August, 1839, Letter Book, page 245.

London Mercantile House—G. F. Angas & Co.—and as Chief or Managing Clerk during the last two or three years of his engagement with that firm: and at the severance of that connection, Angas was able to speak of him as "a pious and clever man."(13) As early as July, 1836, Flaxman's outstanding abilities had apparently been recognised and he had been sent by the South Australian Company to Hamburg "to attend to the various matters concerning the German emigrants"(14) in whom at the time the Company was showing some interest: and he was subsequently thanked by the Board of Directors for his zeal and enterprise in proceeding to Berlin of his own accord, in the hope of overcoming the obstructive tactics of the Hamburg authorities:(15) unfortunately his efforts, however well intentioned, were of no avail: the King of Prussia proved as stubborn as Pharaoh of old, and refused to let the "persecuted" Silesians go.

If we wished to form an adequate idea of the difficulties into which G. F. Angas was about to be precipitated it should be recalled that essentially he was a successful blend of two things, usually accounted antipathetic; namely, a sincerely religious man on the one hand, and a highly successful business man on the other: and contrary to what usually happened in such combinations, it was his religion that controlled his business acts, and not his business acts his religion. As a business man he was a meticulous planner, who generally succeeded in making due provision against "the slings and arrows of outrageous fortune": and in the case under consideration it was the utterly "unexpected" in Flaxman and his apparent defection from the religious principles which they were supposed to hold in common, which was the bitterest pill to swallow: "my partner, Mr. Miller, and myself are almost overwhelmed with the consequences of Mr. C. Flaxman's proceedings, which are likely to prove of the most calamitous nature and have plunged us in the most profound grief. The consequences to me, to my House in London, to Mr. Flaxman's House, to the South Australian Company, and to the Colony are appalling to contemplate. It is a movement in Providence perfectly mysterious to man, under which I am helpless as a child, and can only lie passive in the hands of God. It is the more astonishing that Mr. C. Flaxman should have been permitted to act so, because it is so contrary to all my preconceived ideas of the man, to his whole conduct during the nine years he was in my Counting House, to the principles of sober business ever exemplified in my example before him and to his own professed Christian principles. . . . . The only principle on which I can account for his conduct" was "that he has been afflicted with monomania, or that he has fallen into the snare of the devil, who doubtless has been incessantly labouring in his malignity to shoot his arrows into the hearts of those who have laboured so much to rescue the afflicted people of God from the hands of the oppressor. . . . . Flaxman advises me that he has actually drawn on me at 60 days' sight for above £30,000; and that he might even go to the extent of £100,000: indeed his ecstasies appear to be so great and his schemes so comprehensive that I wonder he does not propose to buy the whole Colony outright and propose me for the sovereign of it."(16)

Apart from the unauthorised purchase of land, what had Flaxman done to warrant this outburst of his quondam employer, and many others of like tenor? To this question G. F. Angas's biographer—Edwin Hodder—succinctly, and yet quite inaccurately replied that "instead of confining himself to the mission he was sent out *exclusively* to perform—of collecting moneys advanced to the Germans, looking after the improvement of their settlements, and so forth—Mr. Flaxman went into business on his own account, and established or joined the

(13) George Fife Angas to Frederick Lester, 28th May, 1838, Letter Book, page 140A.

(14) E. J. Wheeler to Charles Flaxman, 10th July, 1836.

(15) E. J. Wheeler to Charles Flaxman, 26th July, 1836.

(16) George Fife Angas to David McLaren, 30th October, 1839, Letter Book, pages 239 and 240.

mercantile firm of Flaxman and Rowlands at Adelaide. (17) Now, it was quite true that the task of overlooking German emigrants on their outward journey, and subsequently of assisting them to settle in comfort in South Australia had fallen to Flaxman's lot: but almost, if not entirely, of his own free will; nor was there anything to show that such work had been carried out in the character of a paid servant of G. F. Angas, or indeed of anybody else: on the other hand indications were not wanting that from the day that Flaxman first set foot on the *Prince George*, he did so as his own master; and subsequently that any financial work he might have transacted on Angas' behalf—such as collecting advances made to Germans for their passages out or advances made to many settlers of British descent—from the rank of Governor downwards—was definitely on a commission basis of payment. Might not facts such as these in some measure account for the megalomania which undoubtedly took possession of Flaxman in this unwonted liberty, and which eventually led to his undoing? As for the firm of Flaxman & Rowlands, which Flaxman was alleged by Hodder to have joined in Adelaide to the neglect of his more legitimate engagements, it was as a matter of fact, founded in London, on the 26th May, 1838 (18)—*i.e.*, about six months prior to Flaxman's arrival in Australia—under the auspices and direction of G. F. Angas himself—the two original partners being Charles Flaxman and Edward Rowlands. Angas had on occasion toyed with the idea of opening a branch of his London House—G. F. Angas & Co.—in Adelaide, under the management of a partner of the firm: (19) he had however, an innate predilection for indirect methods of doing business, involving the spread of his capital over enlarged fields of action: and in Flaxman's departure for Adelaide he saw a splendid opportunity to bring his pet theories into play, by substituting for a branch of his own firm, a new firm, managed by a man in whom at the time he had implicit confidence; but under the financial control of G. F. Angas & Co. And in so doing he hoped to secure several desirable objectives, namely: To an old and well-tried servant he would grant the semblance of financial freedom—the House of Flaxman & Rowlands, it should be said here, was almost, if not entirely financed by G. F. Angas & Co.—and an opportunity progressively to build up a fortune by assiduous application to business: "a pious young man of the name of Rowlands" (20) would be given the inestimable advantage of starting business life in association with a man of Flaxman's unimpeachable training and judgment: he—Angas—would retain the good will and the good offices of the new firm at less cost than the maintenance of a new branch of his own firm in a distant land: and he would be taking full advantage of a promising new opening for the investment of surplus capital: hence, as might have been expected, far from finding fault with Flaxman's activities as a partner in the House of Flaxman & Rowlands, Angas was inclined to reproach him for neglect of these, his legitimate duties. "I was sorry to perceive," he wrote, "the general depression of your spirits evinced in the tone of your letters to us. This we deeply regret because the goodness of the Lord has been singularly displayed in our being able to procure for you the consignments of so many vessels and goods. To these you ought to give your best attention, and which by patient application and perseverance could not fail to afford you a very respectable income. *The commission business we consider the legitimate trade which you went to South Australia to establish and prosecute, and in support of which we*

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(17) *George Fife Angas*, by Edwin Hodder, 1891, page 242.

(18) The formal dissolution of partnership was worded as follows:—"29th July, 1839. The partnership subsisting between ourselves under the Firm 'FLAXMAN & ROWLANDS' *according to the agreement entered into in London on the 26th May*, 1838, is this day dissolved by mutual consent.—CHARLES FLAXMAN—EDWARD ROWLANDS."

(19) George Fife Angas to David McLaren, 3rd February, 1838, Letter Book, page 142.

(20) George Fife Angas to David McLaren, 19th May, 1838, Letter Book, page 138A.

have given you all our influence and support. If we are correct in our judgment we infer from your letters that you are not content to go on with that line of things, but are seeking to be rich in a quicker manner by a series of speculations in land. I do not think that you are acting wisely in so doing. . . . If I had chosen to speculate largely in land in South Australia I had both the opportunity and the means long before; but my desire was rather to do good than to grow hastily rich; and this was an example that you might safely follow. Your notions of the profit to be made at Port Lincoln are extremely speculative, and I am greatly afraid that you have caught some of the mania for land speculation which characterises the settlers in South Australia at this time. Good may be done there, but it was a dangerous and rash experiment for you as an individual to enter upon; when you do not even say that you are sure that there is good land and plenty of water to be got there. . . . Let me beg of you to avoid everything like speculation in lands. *If you had spare capital, the case would be otherwise.* . . . If you neglect your present mercantile opening, it may never occur again, while otherwise you will be first House in Adelaide." (²¹)

Angaston—Evening.

[*Plate* 70.] (From *South Australia Illustrated*, by Geo. French Angas.)

It was an illuminating comment on the difficulties of control from a distance in those days of sailing vessels and slow means of communication, that whilst Angas in August, 1839, was laboriously rebuking Flaxman for neglect of his commercial duties, and dangerous indulgence in land speculations, the latter had already been guilty in the month of May of the far graver act of involving Angas himself, without his knowledge or authority, in the purchase of 28,000 acres of land in the Barossa Range. "It was little short of insanity," wrote Angas on learning of these transactions, "and the very highest presumption for him"—Flaxman—"to draw upon me for so large an amount, for such wild speculations, and entirely without my knowledge and consent." (²²) Angas

(²¹) George Fife Angas to Charles Flaxman, 16th August, 1839, Letter Book, page 245.

(²²) George Fife Angas to David McLaren, 30th October, 1839, Letter Book, page 240.

was equally outspoken on Flaxman's commercial derelictions: "It is not of this affair alone that I have to complain," he wrote, "he has brought us into serious trouble by refusing to take charge of some of the vessels and consignments which we had with difficulty procured for him, and his previous neglect of those he did receive, and neglect of correspondence in respect to them has done irreparable injury to my House in London. What a return for all the efforts we have made in labour, capital, and influence to establish for Flaxman and Rowlands one of the most respectable Houses in South Australia! (²³) And when, as was inevitable, the House of Flaxman and Rowlands fell into dire financial straits, Flaxman did not scruple to ascribe the downfall of the firm exclusively to the incompetence of his junior partner: in the circumstances and in justice to the latter, the following facts must be put on record. Flaxman reached Adelaide on the 18th November, 1838, and his partner Rowlands seven and a half months later—*i.e.*, on the 30th June, 1839: hence during the critical opening months the fortunes of the firm were in the sole hands of Flaxman himself: and what can he be said to have done towards fostering them? Judging from his preoccupations and exploits in other directions, very little indeed. During the first two months much of his time must have been taken up in endeavours to settle the German immigrants in their new surroundings; and in devising means for their satisfactory employment; concerning all of which full details were given in the course of a lugubrious letter to Angas, from which the following statement concerning his personal affairs had been abstracted: "As to my own prospects I do not yet venture to pronounce an opinion: on my arrival from all I could hear and see, I was inclined to be extremely dispirited; but I must see further before I shall be qualified to judge for myself: and indeed I have been so incessantly occupied with this business of the Germans, with inquiries—applications of various kinds . . . &c., &c., that I could not give many moments' consideration to my own personal matters and interests." (²⁴) Thereafter—from mid-January onwards—most of Flaxman's time seemed to have been spent in scouring the country for territorial bargains: and we were compelled to the conclusion that for the greater part of the time the commercial affairs of the House of Flaxman and Rowlands, *and of their distant clients,* were left to shift for themselves—at all events down to the close of May, 1839, by which time Flaxman's land hunger, if not actually satiated, was somehow or other brought to an abrupt halt. One example only as to how the clients of the House must have suffered in the meantime should suffice. What must have been one of the first, if not the very first consignment of goods, received by Flaxman and Rowlands at Adelaide, was forwarded to them, on the advice of G. F. Angas and Co., by James McLaren, of Edinburgh—brother of the Colonial Manager of the South Australian Company. The goods were placed abroad the *Prince George,* Captain Young—not, however, the *Prince George* which brought out Flaxman and the German emigrants to South Australia. The formel vessel arrived off Glenelg on the 26th December, 1838—about five weeks after Flaxman's arrival in South Australia. There then was a consignment of goods—a first consignment perhaps—for the proper disposal and acquitment of which Flaxman, the trained business man, must have been solely responsible: and yet more than three years later—29th January, 1842—the consignor was compelled to approach James Frew, of Adelaide, with the request that as the Attorney of James McLaren, he should compel Flaxman and Rowlands to render due account of goods supplied from Scotland as far back as 1838. (²⁵)

(²³) George Fife Angas to David McLaren, 30th October, 1839, Letter Book, page 241.

(²⁴) Charles Flaxman to George Fife Angas, 15th December, 1838 (in South Australian Archives).

(²⁵) James McLaren to James Frew, 29th January, 1842 (in South Australian Archives).

When faced with the difficulty of accepting or refusing Flaxman's unauthorised drafts, we could accept without question Angas' passionate assertions to the effect that he had never given to Flaxman authority to draw upon him for the latter's speculations in land; that he had never intended that Flaxman should purchase land on his own account with his—Angas'—capital: and that such proceedings were in direct contravention of all the purposes for which Flaxman had set out to start business in Adelaide. Better than any other man Flaxman knew, from his long and intimate association with Angas' business affairs, that the latter's "property was so locked up and preoccupied" that it would be impossible for him to withdraw drafts of £30,000, or even one-tenth of that amount, unless he borrowed money for the purpose: and better than any other man, Flaxman knew that it had been an invariable rule of Angas' business life never to borrow money for speculative purposes. (^{26}) If need were, Flaxman's own words on a related matter could be quoted in personal confirmation of his knowledge of Angas' views and position: adverting to the difficulties he had met in his attempts to settle his party of Germans in South Australia, Flaxman stated that the plan to which he had been ultimately driven "after the most anxious consideration . . . and agonising prayer" was to get the Germans to locate upon one of Angas' 134-acre country sections, and to clear and cultivate it upon their own account. To this end he had been obliged to advance them—*on Angas' account*—£1,200 for progressive purchases of stock, seeds, &c.: the advance would bear interest at the rate of 15 per cent. per annum; and the section would be leased to them at an annual rental of 5s. per acre for a period of seven years. "*One of my most obstinate grounds of hesitation* to make up my mind to this plan," wrote Flaxman, "was that you would be involved in *an additional advance of money, which I was so distinctly aware you would prefer avoiding,* but the situation of things was such, that it was quite impossible to escape that condition; and I hope the entire measure will afford advantages more than equivalent to *a departure in one respect from your wishes.*" (^{27}) According to the French, it was but the first step that cost, and Flaxman having with some diffidence overcome scruples, contracted in a narrower atmosphere, in the matter of his first unimportant raid on Angas' coffers, and having apparently escaped without retribution, proceeded more confidently upon extended operations to the tune of more than £30,000, with a possible £100,000 in view.

Conscious of his own rectitude, but suspecting nevertheless that in the freer environment of the Colony, he might have strayed somewhat from the narrow path than Angas expected him to tread, and that thereby trouble might possibly ensue, Flaxman determined to return to England, and beard the lion in his den, as soon as possible after the arrival of his partner in South Australia. Of this piece of news Angas was apparently made aware by a letter from Flaxman dated 26th May, 1839 (^{28}), *i.e.*, about one week after the completion of the purchase of the seven Flaxman Special Surveys. On 30th June, 1839, Edward Rowlands, that "pious" but inexperienced young man, landed in South Australia from the barque *Seppings*. His subsequent Colonial education must have been exceedingly rapid: but we should recollect that he was in the hands of an experienced teacher who happened himself to be in a hurry. On the 17th July—little more than a fortnight after landing—he had profited by his lessons to such an extent that he, too, took up land speculation, and in association with Joseph Gilbert and George Miller, of London, took a limited interest in the "Wiltshire" Special

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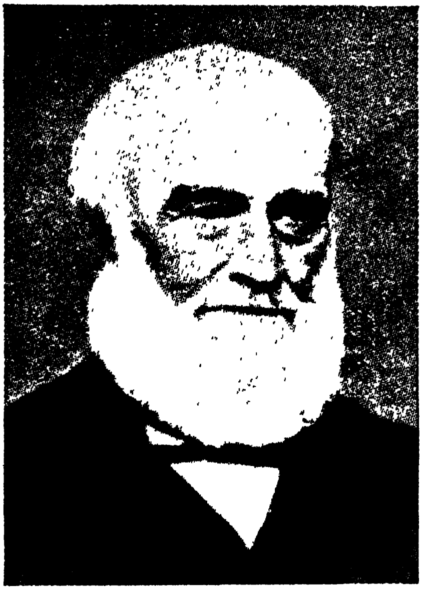
(^{26}) George Fife Angas to David McLaren, 30th October, 1839, Letter Book, page 240.

(^{27}) Charles Flaxman to George Fife Angas, 15th December, 1838 (in South Australian Archives).

(^{28}) George Fife Angas to David McLaren, 30th October, 1839, Letter Book, page 240.

Survey—No. 21—4,000 acres in area, "commencing at the northern boundary of the South Australian Company's Special Survey of Lyndoch Valley, and extending to the northward and eastward in the direction of the Special Surveys taken by Mr. Flaxman." About a fortnight later—on the 29th July, 1839—and about one month after reaching Australia, Rowland's colonial education was evidently deemed to be complete; and the partnership of Flaxman & Rowlands was secretly dissolved in peculiar circumstances. It had already been stated that the firm had been almost entirely financed by G. F. Angas & Co.: and accordingly the two partners deemed it wise to advise their chief creditors of the altered conditions of the firm. The letter in which this information was naively conveyed was so remarkable that it has been given textually below:—



Joseph Gilbert, Pastoralist (1800-1881). [Plate 71.]

Messrs. G. F. Angas & Co.,
London.
Adelaide, 5th August, 1839.

Dear Sirs,

In consequence of our C. Flaxman's return to England and the uncertainty as to his ulterior arrangements, we have consulted as to the advisableness of signing a dissolution of partnership, *to be made use in London*, if necessary, and decided to do so, and have consequently done so.

In consideration of the success which has attended our C. Flaxman, he does not intend to charge the business with the expense of his passage out, nor to receive anything for his services in establishing the business, or for the expenses of his establishment, nor to claim any portion of the profits arising, or to arise, from the sales of the goods either imported, or bought here: and our Edward Rowlands has on the other hand, on that account, written to exonerate our C. Flaxman from any loss upon any speculations on our joint account.

As respects our arrangement with yourselves, we trust that this dissolution will not be deemed a departure from, or that you cannot apprehend any prejudice to your interest from its occurrence. Our credit and character is now so firmly established in the Colony, our connection is so excellent, and our sheep business is so promising, that there is no doubt whatever of our E. Rowlands succeeding beyond our utmost expectations at first.

We shall keep the fact of our dissolution strictly private, until our C. Flaxman has conferred with you on his return to England, when any new arrangements can be made public at the same time as the notice of our dissolution of partnership.

Yours faithfully,
C. Flaxman
Edw. Rowlands
Flaxman & Rowlands.

It would have been difficult to believe that such a letter could have been composed by Charles Flaxman—the clever, well-trained business man—but for the facts that it had come down to us in his own handwriting, on the one hand,

(29) In South Australian Archives.

and that it was quite impossible to allow that Edward Rowlands might have been its author, on the other. And in such circumstances it seemed that Flaxman must surely have considered G. F. Angas & Co. quite as great simpletons as he subsequently asserted his partner to have been—and as he quite likely might have been. But the reactions of G. F. Angas & Co. to this letter were quite normal and business-like. "All that we can do in respect to your proposed separation," the firm wrote, "is what we have already done, viz.: to give you notice that we shall withdraw our capital and terminate our agreement with you on the 1st July, 1841. . . . . *Unquestionably Mr. Charles Flaxman remains a partner in the House until its obligations are discharged.*"(30)

As to the letter itself, including its childish minatory device, as to silence in the matter of dissolution of the partnership, until such time as Flaxman had been able to make effective use of it in London, it opened the door to sundry conjectures, which must probably continue unanswered until doomsday. How, for instance, account for our C. Flaxman's quixotic renunciation of the great advantages that must surely have attached to a thriving mercantile concern? To the tale of his renunciation as set out in the letter must be added another sentence of which Flaxman made frequent use in subsequent correspondence: "I have never had one penny"—or "one farthing" according to his mood at the time—"out of the concern:"(31) was it necessary that we should accept such statements literally? And if so, whence had come the funds that had so improved Flaxman's position as to render him uncommonly generous to an unwanted partner? Or was it that the balance between profit and loss was not so much in our Edward Rowlands' favour as our C. Flaxman would have had us believe? And finally how could a "sheep business" contribute to the success of an already successful Mercantile House, particularly under the management of our Edward Rowlands, who might be quite justifiably supposed to know even less about sheep management than he did about commercial bookkeeping? On the whole, however, it looked very much as if our C. Flaxman was intent on deserting a sinking ship, but not without a pious hope that some unforeseen miracle might yet save his partner from shipwreck. In any event, he left for England with his family, on the 12th August, 1839, about nine months after his arrival in South Australia, and about five weeks after the arrival of his inexperienced partner. "I did not then contemplate returning to the Colony," (32) such was Flaxman's admission to a Hamburg correspondent; and in a way it supplied the key to many of his unaccountable doings.

In the meantime Angas awaited his return with some misgivings; at that time he was still determined not to retire Flaxman's drafts, but feared that an awkward situation might arise should the latter "not arrive in England previous to the expiration of the 60 days' sight named in the drafts." (33) Hence he looked around for other means which might possibly save Flaxman from the disgrace and pecuniary loss of dishonoured drafts. "On receipt of Mr. Flaxman's letters" . . . he wrote, "I at once decided to act with justice to the" South Australian "Company, although in direct opposition to Flaxman's golden prospects of the increase of my personal property: . . . being content with what I have, I felt no inclination to increase my property by any unjustifiable speculations such as this is: I felt that in fact these seven Special Surveys, were actually paid for by the" South Australian "Company's money; and therefore as far as Mr. Flaxman had put it into my power, I offered the whole to the Board on the same terms as Mr. Flaxman had offered the three-fourths of the land to me. ([34]) This after mature deliberation has been twice declined by the Directors: first because of the want of funds, and in the next place on account of the conditions with which Flaxman had clogged the offer, viz.:—The reserve of one-fourth to himself, nay even one-half, besides having drawn for his commission of 10 per cent. on the whole purchase; without stipulating for the repayment of the advance thereby made to him, or the terms of interest thereon, if any; and the reserve he has made for himself of the first choice of his 7,000 or his 14,000 out of 28,000 acres. . . . Upon the refusal of the Board to entertain the proposition made to them, my next intention was, if possible, to save the"

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(30) G. F. Angas & Co. to Flaxman & Rowlands, 16th January, 1841, Letter Book, page 347.

(31) Charles Flaxman to Thomas Roberts, 26th June, 1841; to T. P. Devitt, 26th June, 1841; to G. F. Angas & Co., 22nd July, 1841; to R. V. Swaine, 21st December, 1841, &c., &c.

(32) Charles Flaxman to R. V. Swaine, 22nd September, 1841, Letter Book, page 43.

(33) George Fife Angas to David McLaren, 30th October, 1839, Letter Book, page 243.

The Kaiserstuhl, from Pewsey Vale.

[*Plate* 72.] (*Courtesy Archives.*)

South Australian "Company from being compelled to make this advance to Flaxman; or in other words in consequence of your"—David McLaren's—"having discounted his drafts to pay the Commissioners at this end the £28,000 which you had received at Adelaide for the seven Special Surveys. To this end I sounded the views of several capitalists on their disposition to purchase land in South Australia; and I think it would have been practicable to have disposed of the whole of the 28,000 acres at 20s. per acre, if not for a little more, besides allowing Flaxman the usual commission; which would have saved his credit, sustained my character which is likely to be unjustly affected by Charles Flaxman's conduct, and have prevented the" South Australian "Company from making another call upon the shareholders, which I am persuaded at this crisis would be attended by most disastrous consequences." ([35]) However, on careful examination of the whole position, Angas came to the conclusion that "Flaxman had so clogged up the whole affair that it" would be "impossible for" him "to offer any portion of the lands for sale in that country." And in that view he was supported by his solicitors—Messrs. Bartlett & Beddome—"who declared that

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([34]) This statement of G. F. Angas was confirmed by the Minute Book of the South Australian Company, vol. 2, page 31, 18th October, 1839. It was then resolved that "A committee of Messrs. Buller, Kingscote, and Waymouth with the chairman to meet on the 22nd instant at 3 o'clock to investigate and report on the propriety of accepting the chairman's offer of Mr. Flaxman's Special Surveys."

they could not advise anyone to advance money for the purchase of property so situated": and that Flaxman had left Angas no alternative but to refuse acceptance of the former's drafts, whatever might be the consequences.

But on the 1st February, 1840—*i.e.*, between three and four months before Flaxman's arrival in London—G. F. Angas wrote a hurried note to David McLaren from which the following statement was taken: "I have only a moment to say that *I have accepted Flaxman's drafts,* and hope to pay them: but it will oblige me to sell all my disposable property, bonds, Union Bank shares, and to abandon my business at Newcastle." (36) Angas' sudden change of mind in the matter of the payment of the Flaxman drafts was attributed by him to progressive realisation, as the period of maturity of the drafts approached, of what refusal to retire them must eventually mean to many of his personal friends both at home and abroad, to the House of Flaxman & Rowlands, in which both he—Angas—and his House were interested, to the South Australian Company and its colonial officials in particular, and even to the Colony itself: in his own words, in order to safeguard these many interests, his "money" was "drawn from" him "against" his "wish." And he added, "Happy would it have been for South Australia if the Commissioners in London had done as much to save the credit of the Colony, as I have done in the case of Charles Flaxman, at an enormous cost of money and trouble in England. They have plunged the Colony into the loss of its credit, by refusing all the Governor's drafts and stopping the emigration entirely." (37)

Eventually Charles Flaxman turned up in London early in May, 1840, and thereafter protracted, and even bitter negotiations ensued between Angas and him, over their complicated financial and land interests and relationships. Angas found "the most astonishing change in Flaxman from his trip to Adelaide. He is not the same person and is very lofty and unreasonable, that I cannot negotiate with him with any sort of comfort." On the 9th June, 1840, they seemed to have come to some sort of general agreement—known to them subsequently as the *Manchester Agreement*—whereby in principle Angas was to receive three-fourths and Flaxman one-fourth of the lands purchased by Flaxman in South Australia and officially registered in his name, but which had been paid for with Angas' money: and that subsequently Flaxman was to pay back to Angas the prime cost of his one-fourth of the said lands: in addition, Flaxman was to hand over to Angas all documents relating to land already sold, or contracted to be sold: and there were other adjustments of minor importance. (37) Unfortunately, on further consideration, and notwithstanding ulterior solemn engagements, Flaxman, who for the moment had the whiphand, declined to implement the agreement: and there immediately followed a stream of bitter letters from one to the other. Finally, as a last resort, Angas suggested *arbitration* as a way out of their difficulties. "Far be it from me to put you to any law expense he wrote "which must be your entire ruin from the state of your finances: my wish is to see you prosper on principles of justice and equity." (38) This offer was apparently "deliberately refused" by Flaxman; whereat Angas, after warning the latter of the dangers of the course he proposed to pursue, informed him that his correspondence with Flaxman would thereafter cease. (39) Six weeks later, however, having learnt that Flaxman had taken his passage for South Australia, Angas determined to make a last effort to bring about a satisfactory settlement between them before Flaxman's departure from England. "I think," he wrote, "you cannot have any satisfaction,

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(35) George Fife Angas to David McLaren, 30th October, 1839, Letter Book, page 241.
(36) George Fife Angas to David McLaren, 1st February, 1840, Letter Book, page 249.
(37) George Fife Angas to Edward Stephens, 12th October, 1840, Letter Book, page 263.
(38) George Fife Angas to Charles Flaxman, 26th October, 1840, Letter Book, page 272.
(39) George Fife Angas to Charles Flaxman, 31st October, 1840, Letter Book, page 276.

in leaving England under the very disagreeable position in which you stand with respect to me, especially as there is one means of settling all our disputes left to us both; and which I think, if we make any pretension to Christianity, neither of us would be consistent in refusing to resort to, and that is *arbitration*. . . . It is quite certain that if each of us wants no more than what is just, honest, and honourable, we may be quite satisfied to put ourselves into the hands of Christian men to decide between us. They are far more likely to do us justice, than either I or you would be likely to do to each other, from our prejudiced and partial feelings, natural enough in a case of such a peculiar kind. . . . Whatever their decision may be, I shall consider it the voice of God, and submit for the sake of peace." (40)

This last minute appeal was successful, and resulted in all points in dispute being referred to the arbitration of Thomas Roberts, Mahogany Broker, of London, on the 23rd December, 1840, his final award being dated 9th January, 1841 (41). The award in question, which in the main was based upon the principles laid down in the Manchester Agreement, was lengthy, entering into minute details of procedure: in a very general summary it may be said to have included the following essential points:—

1. Three-fourths of the Boston Bay Lands, or any other lands that might be substituted for them, would be the property of G. F. Angas; and one-fourth the property of C. Flaxman.
2. Expenditure incurred for the same would be shared in the same proportions.
3. C. Flaxman would reimburse G. F. Angas for the prime cost of the above lands with interest from the 27th January, 1840.
4. All rights in and costs of Barossa Range Lands to be divided in the same proportions as corresponding items of the Boston Bay Lands.
5. C. Flaxman would not be entitled to commission for either purchase.
6. G. F. Angas should receive three-fourths and C. Flaxman one-fourth of the payments made by Germans who had contracted to purchase 2,000 acres of land in the Barossa Range.
7. The same conditions and ratios should apply to 1,700 acres of land sold by C. Flaxman to other parties from surplus lands of the seven Surveys.
8. Immediate steps should be taken by whomsoever was concerned to convey such lands to the party entitled to them.
9. G. F. Angas should be given the custody of all documents relating to the sales of the 2,000 acres and the 1,700 acres, respectively. (42)

The settlement of all these difficulties that had previously involved six months of fruitless negotiations, gave unfeigned delight to G. F. Angas, who in advising Anthony Forster—his agent in South Australia—of the result stated: "I am most grateful to Providence for the issue of my arrangements with Mr. Flaxman before he left us. He wrote me a very kind letter from Gravesend on his sailing, and I hope you will do all in your power to continue the good feeling between us, as I wish to forgive and forget what is past."(43) But alas for human nature! Angas' pious hope seem doomed from birth: Flaxman suspected that Forster had taken an intense dislike to him on sight: (44) there could be no peace between hurt thwarted ambitions on the one hand and black suspicions on the other: the conflict ceased undoubtedly in England, but was soon renewed on another continent, with tenfold increase in bitterness. It was not long before Forster and Flaxman were no longer on speaking terms, except for

(40) George Fife Angas to Charles Flaxman, 11th December, 1840, Letter Book, page 336.

(41) George Fife Angas to Anthony Forster, 14th January, 1841, Letter Book, page 342.

(42) George Fife Angas to Anthony Forster, 13th January, 1841, Letter Book, pages 340 and 341.

(43) George Fife Angas to Anthony Forster, 6th February, 1841, Letter Book, page 352.

(44) Charles Flaxman to George Fife Angas, 19th June, 1841, Letter Book, page 3.

strictly business purposes; nor could they exchange written business communications without including in them direct or veiled insults. Eventually, however, after interminable wrangles the clauses of the award that related to the division of the lands, if not the financial clauses, were definitely settled: and in time George Fife Angas was able to enter into possession of his Australian estates which for some time previously had been placed under the successful management of his able son—John Howard Angas.

Charles Flaxman, on the other hand, had even more serious troubles to face in the settlement of the affairs of the House of Flaxman & Rowlands, which nearly two years earlier he had so generously handed over to his junior partner.

View from Hall's Gully, looking over Angas Park.

[*Plate* 73.] (From *South Australia Illustrated*, by Geo. French Angas.)

His first letter to G. F. Angas on his return to South Australia illustrated the difficulties of the position with which he had to cope: "My distress of mind was very great. So far as I can judge the assets will be next to nothing. Since I left scarcely half a dozen letters have been written; *and not a line* to any of the constituents of the House, which Rowlands accounts for by saying that he had the strictest injunctions from Mr. Miller, never to communicate direct with other parties. He has applied a good deal of the other moneys sent out for investment to the general business. The books are in great confusion, and the affairs are become still more complicated and difficult of adjustment, because of his having entered into partnership with Mr. Cooke, without in any way securing, but on the contrary, not without sacrificing the interests of Flaxman and Rowlands and their constituents. And because also of his having assigned over all his interests of every kind to Mr. George Morphett, which will interfere, I fear, with any speedy settlement, on account of his possessing, though but nominally, a private estate. The condition of Mr. Rowlands's health is also such that I cannot speak harshly to him, though I am ruined by him as indeed I am victimised on all hands. . . . . As to what course to pursue, I am of course at a great loss. So far as my legal responsibility goes, I am ready to suffer to the uttermost. It is, however, very *very* hard that *the comfortable little fortune which I might have reckoned upon from my share in our lands* should be swept away by my liability for the deeds of Mr. Rowlands, with whom it was quite against my inclination that I went into partnership at all; and who was indeed by my position at that juncture in effect forced upon me by your House."(45)

Circulars were sent out to all the overseas creditors of the firm setting out the extraordinary conditions that had confronted Flaxman on his return from Europe; and with the circulars was a letter signed by Edward Rowlands, in which the latter shouldered all the blame for the catastrophe that had befallen the firm.(46) To cut a long story short, eventually the creditors agreed to place the affairs of Flaxman & Rowlands in the hands of two Trustees—George Morphett and Robert Frew—and as the result of the labours of the latter received 2s. 5d. in the pound: G. F. Angas & Co., the chief creditors—£10,602 7s. 11d.—lost thereby £9,323 7s. 11d. for their enterprise in undertaking to finance the firm. On the 31st March, 1843, Flaxman was released by his creditors: unfortunately he was never able to recover from his financial losses and had eventually to go through the Insolvency Court in 1851. And so came to a close the drama of the SEVEN SPECIAL SURVEYS.

APPENDIX XVI.

The "Flaxman River."

The exploring German emigrants who were said to have named a stream which they had found flowing through "Light's Pass" the *"Flaxman River,"* were but paying graceful recognition to the man who had befriended them, during the course of their long voyage of exile, and again during the early days of their settlement in the Province: but unfortunately the river in question was but a section of the North Para, another section of which had already been called the "Gawler River" by Bewes Strangways on the 23rd November, 1838:(1) and since no further references to the "Flaxman River" could be found in official maps or documents, it seemed right to conclude that the officials who had swallowed two names for one river, had baulked at a third name, that did not happen to be the name of a Governor. Nevertheless the grateful German emigrants were not to be wholly cheated of their wish to do honour to the name of Flaxman: and accordingly an adjoining valley to the south-west of Light's Pass and immediately to the north of Tarawatta was from that time onwards officially recognised as "Flaxman's Valley."

APPENDIX XVII.

Circular Letter Concerning the Affairs of Flaxman & Rowlands.

Messrs. Truman, Hanbury & Co., Adelaide,
London. 6th June, 1841.

It is with extreme pain that I have to announce to you that on my return to this Colony from England and on the 5th instant I found to my utter astonishment that in consequence of serious mismanagement and highly injudicious proceedings on the part of Mr. Edward Rowlands during my absence in England on *private business*; and also in consequence of his subsequently becoming disabled for any attention to his duties by a stroke of paralysis, the affairs of the late firm of Flaxman & Rowlands had fallen into a state of very considerable embarrassment. Until I have had time to go into a strict investigation of the books, and to ascertain fully the various respects in which the interests of the constituents or creditors of that house may have been compromised by the inconsiderate acts of my late partner, it is of course impossible for me to afford you any accurate idea of the extent to which their claim may eventually prove to be prejudiced. I feel it however to be my duty to address you this preliminary notification by the earliest opportunity. Particulars shall follow as speedily as possible.

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(45) Charles Flaxman to George Fife Angas, 19th June, 1841, Letter Book, page 1.

(46) See Appendix XVII.: Circular letter concerning the affairs of Flaxman & Rowlands.

(1) *South Australian Gazette and Colonial Register*, 1st December, 1838, page 3, col. 3.

As respects myself individually it is due to my own character that I should most distinctly disown any personal participation whatever in those acts of my late partner, which have produced these most lamentable consequences. I desire in this first communication on the subject to assure the constituents of the late House that at the time of my departure from the Colony in August, 1839, I was not in debt to the firm one penny, nor were the affairs of the House then at all involved. The sacrifice which I may perhaps have to make of the entire residue of my private estate for the benefit of the creditors of that firm will be the consequence alone of such legal responsibility, as may be found fairly to attach to me for the acts of another, over which I had no control, for his neglects which I was unfortunately not on the spot to prevent, and for measures of which I received no previous intimation whatever.

The creditors of the late firm may feel assured of my exerting myself to the utmost of my ability for their behalf under these distressing circumstances. I beg to refer to the subjoined circular from Mr. Rowlands.

C. FLAXMAN.

Edward Rowlands' Statement.

Messrs. Truman, Hanbury & Co.,
London.

Adelaide,
10th June, 1841.

I beg to express my extreme sorrow for the present unhappy position of the affairs of the late firm of Flaxman & Rowlands of this place. In justice to Mr. Flaxman I feel bound to confirm the statement contained in the preceding circular from himself, that at the time of his departure from this Colony for England in August, 1839, he was not in debt one penny to the late firm; nor were the affairs of the House then at all involved; and that since that time the management of the business had rested entirely with myself. However unfortunate the result may be for the creditors of the House, I must in fairness exonerate Mr. Flaxman entirely from being in any degree the cause. So far as the altered state of my health will allow I shall endeavour to render Mr. Flaxman every assistance in my power in his examination into the affairs of the House and trust the result may be more satisfactory than he anticipates.

EDWARD ROWLANDS.

The above circulars which could be taken to represent Flaxman's personal defence of his connection with the House of Flaxman & Rowlands, have been inserted here in justice to him: they could not, however, be left without critical comment. If E. Rowlands were capable of the blunders and mismanagement asserted by Flaxman, could we believe that after a mere five weeks' stay in the Colony, he was really competent to express an opinion as to whether or not the affairs of the House were involved at the time of Flaxman's departure for Europe. But even if these affairs were not involved, as had been claimed by Flaxman, what right had the latter to abandon an important business concern to the management of an obviously inexperienced and incompetent man? In Flaxman's circular it was stated that he had been to England on *private business*: but in a letter to G. F. Angas & Co. he wrote: "It was a sad mistake that I left the Colony, and the business of Flaxman & Rowlands in the hands of a person who proved so incompetent to carry it on."(1) To R. V. Swaine, of Hamburg, on the other hand, he stated at the time of the dissolution of partnership, that he *did not contemplate returning to the Colony.*(2) Again, he informed G. F. Angas that he had "proceeded to England for the benefit" of Angas' Barossa Lands, and therefore for Angas' advantage.(3) Finally to George Miller—G. F. Angas' partner—he wrote that he returned to the Colony for the express purpose of looking after the interests of the creditors of Flaxman and Rowlands.(4)

All these altruistic voyages and apparent acts of abnegation on the part of Flaxman, are not readily reconciled with his obvious determination "to get rich in a quicker manner": nor did it seem quite fair to throw the whole blame of the collapse of the House of Flaxman & Rowlands upon a junior partner upon whom unexpected responsibility had been injudiciously thrust: surely some blame was attributable to the early neglects of his clever partner and the latter's astonishing desertion of his post to serve his private ends.

(1) Charles Flaxman to G. F. Angas & Co., 22nd July, 1841, Letter Book, page 22.
(2) Charles Flaxman to R. W. Swaine, 22nd September, 1841, Letter Book, page 42.
(3) Charles Flaxman to G. F. Angas, 19th June, 1841, Letter Book, page 1.
(4) Charles Flaxman to George Miller, 6th June, 1841, Letter Book.

(*To be continued.*)

Parafield Egg-Laying Competition, 1938-39.

A further series of Egg-Laying Competitions will commence at Parafield Poultry Station on 1st April, 1938.

Sections have been provided for the Wet Marsh, Dry Mash, and Soaked Grain methods of feeding.

The Competition is all single testing, and each egg laid throughout the currency of the test is weighed.

The Competition affords an excellent opportunity for the single testing of stock, and entry forms and regulations can be obtained from the Chief Poultry Adviser, Box 901E, G.P.O., Adelaide.

Production and Exports.

The production of butter and cheese for December, 1937, was:—Butter, 1,797,833lbs.; cheese, 1,606,989lbs.

Meat exports (figures taken from statistics supplied by the Australian Meat Board)—

	Total Australian Exports, July-December, 1937.	
	Carcasses.	
Mutton	323,667 ..	(S. Aus., 67)
Lamb	3,390,659 ..	(S. Aus., 318,735)
Pigs (porkers and baconers)	111,177 ..	(S. Aus., 3,863)
	Cwts.	
Chilled beef	252,862 ..	(S. Aus., nil)
Frozen beef and veal	1,215,300 ..	(S. Aus., 2,835)

Judging Frozen Pig Carcases for the British Market

[Abstracted from *A Method for Judging Pork and Bacon Carcasses* by H. R. Davidson, John Hammond, Jos. B. Swain and Nevill L. Wright, in ***The Pig Breeders' Annual,*** 1936-7, by W. J. Spafford, Director of Agriculture.]

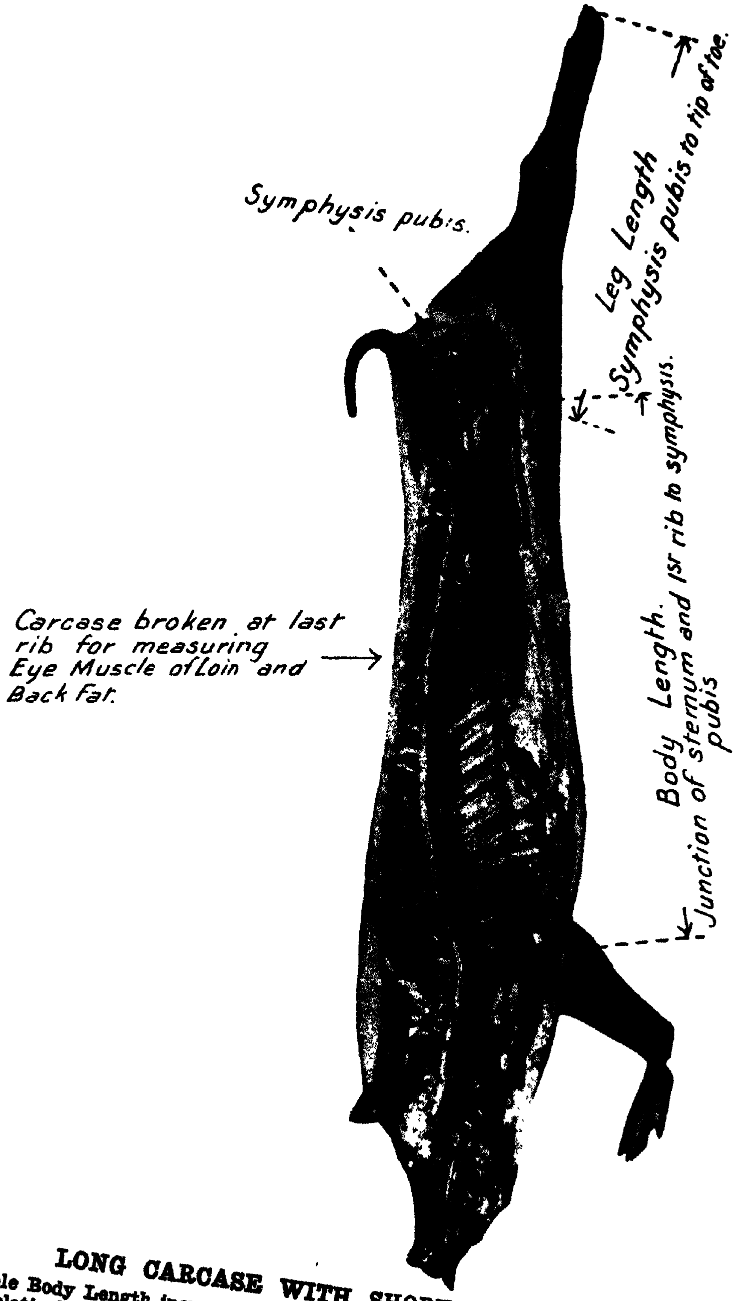
Because of the great possibilities ahead of the Pig Export Industry, and the fact that a definite scheme of judging frozen pig carcases has been adopted in Great Britain, it is of the utmost importance for all interested in the export of pig carcases to understand thoroughly the requirements of the most important market in the world for pig products, viz., that of Great Britain. To help in this direction the salient features of this excellent description of the methods adopted in the judging of frozen carcases have been abstracted.

A committee consisting of the four writers of the above-mentioned article was appointed in 1931, and was asked to report on the suitability of overseas pig carcases for the British markets. Continuing the work for five years, several methods were tried in searching for a means of defining the ideal carcases, and in endeavouring to devise a scheme of allotting points when judging carcases, so as to evolve a system which could be carried out by anyone at any time. Eventually a system was laid down in which most of the judging is done by measurements and a minority of points allotted by inspection.

When arranging the system it was found that because the carcases being judged are frozen it is quite impossible to judge texture, in which softness of fat is such an important factor.

SCALE OF POINTS WHEN JUDGING FROZEN PIG CARCASES.

Features Judged.	Porkers.	Baconers.
1. **Marketing Points—**		
Colour—Clean, fresh, white	5	5
Skin—Smooth and fine	5	
Dressing—Freedom from bruises and hair	5	5
	15	10
2. **Breeders' Points—**		
(*a*) **By Inspection—**		
Hams—Well filled and fine boned	8	8
Shoulders—Light	7	7
Streak—Thick, full of meat	12	12
(*b*) **By Measurement—**		
" Eye muscle " of loin—Thick	28	28
Back Fat thickness—Correct proportion	20	20
Body Length—In proportion to weight	20	20
Leg Length—Short	5	5
	100	100
3. **Suitability of carcase weight**	—	15
Total points	115	125


Symphysis pubis.
Leg Length
Symphysis pubis to tip of toe.
Carcase broken at last rib for measuring Eye Muscle of Loin and Back Fat.
Body Length.
Junction of sternum and 1st rib to symphysis pubis

LONG CARCASE WITH SHORT LEGS.

Considerable Body Length increases the value of the carcase for cutting purposes and relatively short Leg Length means a lessened proportion of bone.

Body Length is measured from the junction of the sternum with the first rib to the edge of the symphysis pubis, and Leg Length from the edge of the symphysis pubis to the tip of the toe.

Procedure During Judging.

After weighing the carcases they are hung at a convenient height for the judge, when points are allotted for Colour (for porkers only), Skin, Dressing, Hams and Shoulders.

The carcases are sawn down the middle line and Body Length and Leg Length are measured.

One side of each carcase is then cut through at the level of the last rib, and the hinder ends are laid out in a row with the cut surfaces facing the judge. On the exposed surface the "Eye Muscle" and Back Fat are measured with callipers and read off on a scale in millimetres, and the Streak is judged.

Allotting the Points.

In allotting the points for the measurable features no judgment is required because tables of figures giving the points for every weight-length are provided, but for those features judged by inspection a good knowledge of the requirements of the trade is necessary and certain rules must be followed.

1. Marketing Points.

Colour (5).—The colour of porkers should be a clean fresh white, with points deducted for pigmented skin, sunburn, excessive drying in storage, or other colour disfiguration.

Skin (5).—The skin should be smooth and not too thick or coarse.

Dressing (5).—Bruises and weals due to fighting, should be absent, and there should be complete absence of all hair and scraper cuts in the skin.

2. Breeders' Points.

(a) By Inspection.

Hams (8).—The bone should be fine and the ham well filled out with lean meat, the space between the legs being U-shaped rather than V-shaped.

Shoulders (7).—Shoulders should be light in proportion to the rest of the carcase, for this is a low-priced part.

Streak (12).—Not only should the belly be thick, but it should contain a high proportion of lean meat. Minimum marks (1) are given for one which is thin, or for one which is thick but which contains a high proportion of fat.

(b) By Measurement.

"Eye Muscle" of Loin (28).—The thickness is measured half-way along its width.

Back Fat Thickness (20).—This is measured with one point of the callipers at the edge of the "Eye Muscle" and the other just on the inner layer of the skin.

Body Length (20).—This is measured from the edge of the symphysis pubis to the junction of the sternum (breast bone) with the first rib.

Leg Length (5).—This is measured in a straight line from the edge of the symphysis pubis bone to the tip of the toe.

3. Suitability of Carcase Weight.

Carcase Weight (15).—The optimum carcase weight for baconers is taken to be 135lbs. to 154lbs., and anything above or below these weights is penalised.

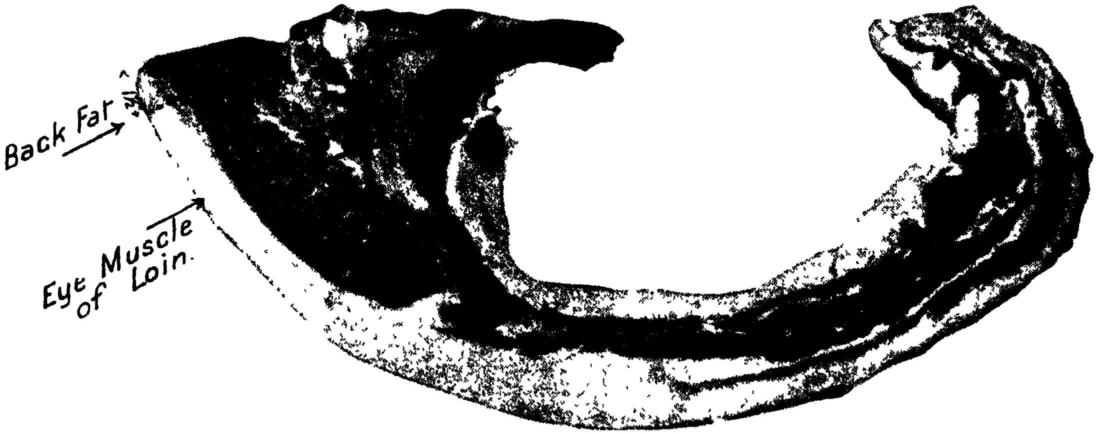
Points by Measurements.

The authors lay great stress on the value of measurements where they can be utilised in the judging of carcases, and even though measurements cannot be applied to several of the features affecting the market price, and which have points allotted to them when being judged, the most important features, such as Body Length and Proportion of Fat to Lean can be accurately measured, and in the system of judging adopted carry a majority of the points allotted.

For the principal weights of carcases most in demand by the British trade the following measurements are taken as the ideal, and so should be allotted the miximum number of points allowed for the particular feature being judged:—

IDEAL MEASUREMENTS FOR PRINCIPAL TRADE WEIGHTS OF PIG CARCASES.

Carcase Weight.	Thickness of " Eye " of Loin.	Thickness of Back-fat over Loin.	Body Length (Symphysis Pubis to First Rib).	Leg Length (Symphysis Pubis to Toe).
Lbs.	Millimetres.	Millimetres.	Millimetres.	Millimetres.
60 to 64	44	9	645	419
65 to 69	45		655	429
70 to 74	46	10	665	439
75 to 79	47		675	449
80 to 84	48	11	685	459
85 to 89	49		695	469
90 to 99	50	12	705 to 715	479 to 489
100 to 109	51	13	725 to 735	499 to 509
110 to 119	52	14	745 to 755	519 to 529
120 to 139	53	17 to 19	765 to 795	539 to 554
140 to 159	54	20 to 21	805 to 835	559 to 574
160 to 179	55	22 to 23	845 to 875	579 to 594
180 to 199	56	24 to 25	885 to 915	599 to 614



HIGH PROPORTION OF LEAN TO FAT.

Eye Muscle of Loin carries more points than any other feature and is measured half way across its width when the carcase is broken at the last rib.

Back Fat of Baconers is measured 1½in. from the middle line of the carcase, with one point of the callipers at the edge of the Eye Muscle and the other point on the inner layer of the skin.

Detailed Tables of Points by Measurements.

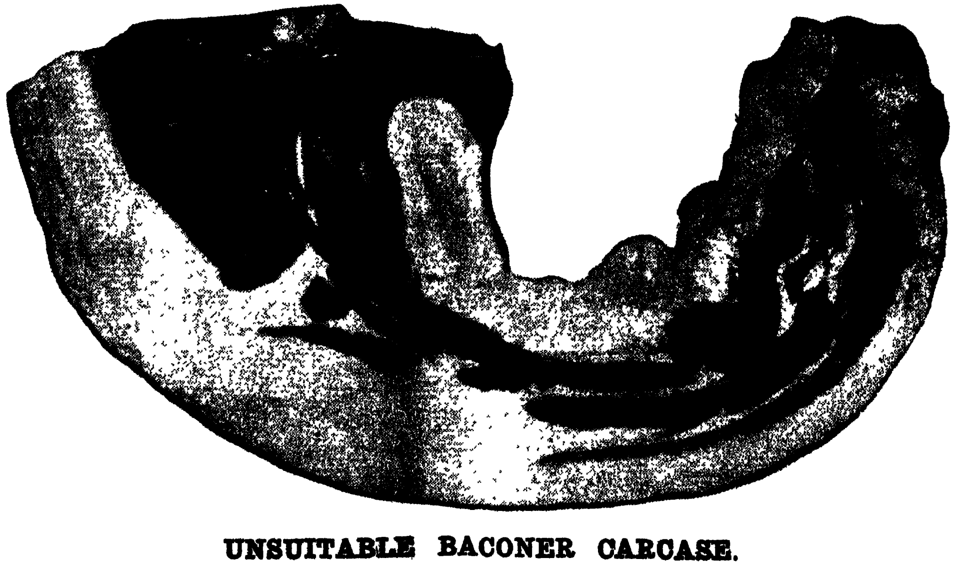
So that the main points allotted in judging can be done with certainty by any one capable of reading measurements correctly, the authors have prepared extensive tables giving the actual points to be given for every particular weight-measurement for "Eye Muscle" of Loin, Thickness of Back Fat, Body Length, Leg Length, and Suitability of Carcase Weight.

MARKS FOR THICKNESS OF EYE MUSCLE OF LOIN.

MEASUREMENTS IN MILLIMETRES *.

Carcase Weight in Lbs.	60 to 64	65 to 69	70 to 74	75 to 79	80 to 84	85 to 89	90 to 99	100 to 109	110 to 119	120 to 139	140 to 159	160 to 179	180 to 199
Marks.	Mms.	Mms.	Mms.	Mms.	Mms.	Mms.	Mms.	Mms.	Mms.	Mms.	Mms.	Mms.	Mms.
1	23	24	25	26	27	28	29	30	31	32	33	34	35
3	24	25	26	27	28	29	30	31	32	33	34	35	36
5	25	26	27	28	29	30	31	32	33	34	35	36	37
7	26	27	28	29	30	31	32	33	34	35	36	37	38
9	27	28	29	30	31	32	33	34	35	36	37	38	39
11	28	29	30	31	32	33	34	35	36	37	38	39	40
13	29	30	31	32	33	34	35	36	37	38	39	40	41
14	30	31	32	33	34	35	36	37	38	39	40	41	42
15	31	32	33	34	35	36	37	38	39	40	41	42	43
16	32	33	34	35	36	37	38	39	40	41	42	43	44
17	33	34	35	36	37	38	39	40	41	42	43	44	45
18	34	35	36	37	38	39	40	41	42	43	44	45	46
19	35	36	37	38	39	40	41	42	43	44	45	46	47
20	36	37	38	39	40	41	42	43	44	45	46	47	48
21	37	38	39	40	41	42	43	44	45	46	47	48	49
22	38	39	40	41	42	43	44	45	46	47	48	49	50
23	39	40	41	42	43	44	45	46	47	48	49	50	51
24	40	41	42	43	44	45	46	47	48	49	50	51	52
25	41	42	43	44	45	46	47	48	49	50	51	52	53
26	42	43	44	45	46	47	48	49	50	51	52	53	54
27	43	44	45	46	47	48	49	50	51	52	53	54	55
28	44	45	46	47	48	49	50	51	52	53	54	55	56

* 25 millimetres to 1in.



UNSUITABLE BACONER CARCASE.

Over-fat baconers have lost popularity, and so have lost their high market value in the principal British Markets of recent years, and a low proportion of fat to lean is demanded almost everywhere in the United Kingdom.

MARKS FOR BODY LENGTH (SYMPHYSIS PUBIS TO FIRST RIB).

MEASUREMENTS IN MILLIMETRES.

Carcase Weight in Lbs.	60 to 64	65 to 69	70 to 74	75 to 79	80 to 84	85 to 89	90 to 94	95 to 99	100 to 104	105 to 109	110 to 114	115 to 119	120 to 124	125 to 129	130 to 134	135 to 139	140 to 144	145 to 149	150 to 154	155 to 159	160 to 164	165 to 169	170 to 174	175 to 179	180 to 184	185 to 189	190 to 194	195 to 199
Marks.	Mms.	Mms.	Mms.	Mms.	Mms.	Mms.	Mms.	Mms.	Mms.	Mms.	Mms.	Mms.	Mms.	Mms.	Mms.	Mms.	Mms.	Mms.	Mms.	Mms.	Mms.	Mms.	Mm.	Mm.	Mm.	Mm.	Mm.	Mm.
1......	550	560	570	580	590	600	610	620	630	640	650	660	670	680	690	700	710	720	730	740	750	760	770	780	790	800	810	820
2......	555	565	575	585	595	605	615	625	635	645	655	665	675	685	695	705	715	725	735	745	755	765	775	785	795	805	815	825
3......	560	570	580	590	600	610	620	630	640	650	660	670	680	690	700	710	720	730	740	750	760	770	780	790	800	810	820	830
4......	565	575	585	595	605	615	625	635	645	655	665	675	685	695	705	715	725	735	745	755	765	775	785	795	805	815	825	835
5......	570	580	590	600	610	620	630	640	650	660	670	680	690	700	710	720	730	740	750	760	770	780	790	800	810	820	830	840
6......	575	585	595	605	615	625	635	645	655	665	675	685	695	705	715	725	735	745	755	765	775	785	795	805	815	825	835	845
7......	580	590	600	610	620	630	640	650	660	670	680	690	700	710	720	730	740	750	760	770	780	790	800	810	820	830	840	850
8......	585	595	605	615	625	635	645	655	665	675	685	695	705	715	725	735	745	755	765	775	785	795	805	815	825	835	845	855
9......	590	600	610	620	630	640	650	660	670	680	690	700	710	720	730	740	750	760	770	780	790	800	810	820	830	840	850	860
10.....	595	605	615	625	635	645	655	665	675	685	695	705	715	725	735	745	755	765	775	785	795	805	815	825	835	845	855	865
11.....	600	610	620	630	640	650	660	670	680	690	700	710	720	730	740	750	760	770	780	790	800	810	820	830	840	850	860	870
12.....	605	615	625	635	645	655	665	675	685	695	705	715	725	735	745	755	765	775	785	795	805	815	825	835	845	855	865	875
13.....	610	620	630	640	650	660	670	680	690	700	710	720	730	740	750	760	770	780	790	800	810	820	830	840	850	860	870	880
14.....	615	625	635	645	655	665	675	685	695	705	715	725	735	745	755	765	775	785	795	805	815	825	835	845	855	865	875	885
15.....	620	630	640	650	660	670	680	690	700	710	720	730	740	750	760	770	780	790	800	810	820	830	840	850	860	870	880	890
16.....	625	635	645	655	665	675	685	695	705	715	725	735	745	755	765	775	785	795	805	815	825	835	845	855	865	875	885	895
17.....	630	640	650	660	670	680	690	700	710	720	730	740	750	760	770	780	790	800	810	820	830	840	850	860	870	880	890	900
18.....	635	645	655	665	675	685	695	705	715	725	735	745	755	765	775	785	795	805	815	825	835	845	855	865	875	885	895	905
19.....	640	650	660	670	680	690	700	710	720	730	740	750	760	770	780	790	800	810	820	830	840	850	860	870	880	890	900	910
20.....	645	655	665	675	685	695	705	715	725	735	745	755	765	775	785	795	805	815	825	835	845	855	865	875	885	895	905	915

MARKS FOR LEG LENGTH (SYMPHYSIS PUBIS TO TOE).

MEASUREMENTS IN MILLIMETRES.

Carcase Weight in Lbs.	60 to 64	65 to 69	70 to 74	75 to 79	80 to 84	85 to 89	90 to 94	95 to 99	100 to 104	105 to 109	110 to 114	115 to 119	120 to 124	125 to 129	130 to 134	135 to 139	140 to 144	145 to 149	150 to 154	155 to 159	160 to 164	165 to 169	170 to 174	175 to 179	180 to 184	185 to 189	190 to 194	195 to 199
Marks.	Mms.	Mms.	Mms.	Mms.	Mms.	Mms.	Mms.	Mms.	Mms.	Mms.	Mms.	Mms.	Mms.	Mms.	Mms.	Mms.	Mms.	Mms.	Mms.	Mms.	Mms.	Mms.	Mm.	Mm.	Mm.	Mm.	Mm.	Mm.
1......	450	and 460	over 470	480	490	500	510	520	530	540	550	560	570	575	580	585	590	595	600	605	610	615	620	625	630	635	640	645
2......	449 to 440	459 to 450	469 to 460	479 to 470	489 to 480	499 to 490	509 to 500	519 to 510	529 to 520	539 to 530	549 to 540	559 to 550	569 to 560	574 to 565	579 to 570	584 to 575	589 to 580	594 to 585	599 to 590	604 to 595	609 to 600	614 to 605	619 to 610	624 to 615	629 to 620	634 to 625	639 to 630	644 to 635
3......	439 to 430	449 to 440	459 to 450	469 to 460	479 to 470	489 to 480	499 to 490	509 to 500	519 to 510	529 to 520	539 to 530	549 to 540	559 to 550	564 to 555	569 to 560	574 to 565	579 to 570	584 to 575	589 to 580	594 to 585	599 to 590	604 to 595	609 to 600	614 to 605	619 to 610	624 to 615	629 to 620	634 to 625
4......	429 to 420	439 to 430	449 to 440	459 to 450	469 to 460	479 to 470	489 to 480	499 to 490	509 to 500	519 to 510	529 to 520	539 to 530	549 to 540	554 to 545	559 to 550	564 to 555	569 to 560	574 to 565	579 to 570	584 to 575	589 to 580	594 to 585	599 to 590	604 to 595	609 to 600	614 to 605	619 to 610	624 to 615
5......	419	429 and	439 under	449	459	469	479	489	499	509	519	529	539	544	549	554	559	564	569	574	579	584	589	594	599	604	609	614

MARKS FOR THICKNESS OF FAT OVER LOIN.

MEASUREMENTS IN MILLIMETRES *.

Carcase Weight in Lbs.	60 to 69	70 to 79	80 to 89	90 to 99	100 to 109	110 to 119	120 to 129	130 to 139	140 to 149	150 to 159	160 to 169	170 to 179	180 to 189	190 to 199
Marks.	Mms.	Mms.	Mms.	Mms.	Mms.	Mms.	Mms.	Mms.	Mms.	Mms.	Mms.	Mms.	Mms.	Mms.
1	1	1	2	3	4	5	7	8	9	10	11	12	13	14
4	—	2	3	4	5	6	8	9	10	11	12	13	14	15
7	2	3	4	5	6	7	9	10	11	12	13	14	15	16
10	3	4	5	6	7	8	10	11	12	13	14	15	16	17
12	4	5	6	7	8	9	11	12	13	14	15	16	17	18
14	5	6	7	8	9	10	12	13	14	15	16	17	18	19
15	—	—	—	—	—	—	—	14	15	16	17	18	19	20
16	6	7	8	9	10	11	13	15	16	17	18	19	20	21
17	—	—	—	—	—	—	14	16	17	18	19	20	21	22
18	7	8	9	10	11	12	15	17	18	19	20	21	22	23
19	8	9	10	11	12	13	16	18	19	20	21	22	23	24
20	9	10	11	12	13	14	17	19	20	21	22	23	24	25
19	10	11	12	13	14	15	18	20	21	22	23	24	25	26
18	11	12	13	14	15	16	19	21	22	23	24	25	26	27
17	—	—	—	—	—	—	20	22	23	24	25	26	27	28
16	12	13	14	15	16	17	21	23	24	25	26	27	28	29
14	13	14	15	16	17	18	22	24	25	26	27	28	29	30
12	14	15	16	17	18	19	23	25	26	27	28	29	30	31
10	15	16	17	18	19	20	24	26	27	28	29	30	31	32
7	16	17	18	19	20	21	25	27	28	29	30	31	32	33
4	17	18	19	20	21	22	26	28	29	30	31	32	33	34
1	18	19	20	21	22	23	27	29	30	31	32	33	34	35

* 25 millimetres to 1in.

BACON PIGS—MARKS FOR SUITABILITY OF CARCASE WEIGHT.

Marks.	Carcase Weights. lbs.
1	110-114
4	115-119
7	120-124
10	125-129
13	130-134
15	135-154
14	155-159
13	160-164
12	165-169
11	170-174
9	175-179
7	180-184
5	185-189
3	190-194
1	195-199

Artificial Manure Subsidy.

A subsidy at the rate of 10s. per ton is payable by the Commonwealth Government to primary producers in respect of artificial manure used during the 12 months ended 30th June, 1937, in the production of primary products other than wheat. Payment is made in respect of complete ton or half-ton lots only, other fractions of a ton being excluded.

The closing date for applications has been definitely fixed as 30th April, 1938, by which date applications must be in the hands of the Secretary, Department of Commerce, 29, North Parade, Port Adelaide. Under no circumstances will it be possible for applications received after that date to be accepted for payment.

Championship Wheat Crop Competition

Won By Mr. E. V. H. Wilsdon, Andrews.

In his report on the Championship Wheat Crop Competition for the 1937-38 Season, Mr. R. C. Scott (Chief Agricultural Adviser) who judged the entries states that the wheat crop competitions supervised by the Department of Agriculture have been conducted in South Australia for the past 13 seasons.

For the first 6 years financial assistance was given by the Government, but unfortunately in 1931 and 1932 it was found necessary to discontinue this subsidy. In the following year, however, a generous donation by the South Australian Farmers Co-operative Union Limited, materially assisted in the success of these competitions, whilst for the past 4 seasons the Government subsidy has been renewed.

Since 1935 additional assistance has been forthcoming from the Millers Produce Company of South Australia Limited, who has kindly made a liberal donation each year to every district conducting a Crop Competition under the control of the Department of Agriculture. However, in making this donation, it was stipulated that certain wheat varieties of low milling quality should not be eligible for the prize.

The help thus given was a very big factor in maintaining interest in the Crop Competitions throughout the period of depression and low wheat prices, whilst this year an increased number of entries was received, a total of 540 crops being exhibited.

TABLE SHOWING PROGRESS OF WHEAT CROP COMPETITION.

Year.	Districts Conducting Competitions.	Number of Crops Exhibited.
1924	12	290
1925	13	248
1926	17	444
1927	19	525
1928	22	634
1929	21	520
1930	19	473
1931	16	352
1932	20	385
1933	19	351
1934	18	328
1935	19	407
1936	18	341
1937	22	540

From the foregoing details it will be seen that the number of districts conducting competitions in 1937, namely 22, has not previously been exceeded, but was equalled in 1928. However, in that year 634 Crops were exhibited comparatively with 540 in the present season. These figures indicate the renewed interest taken in the Crop Competitions and the good general average crops that promised throughout the State. The judges appointed by the Department of Agriculture examined all the crops, made the awards and issued reports on the competitions.

The winning crop in each District Competition became eligible to compete in the Championship unless in the opinion of the judge it was not sufficiently good to be worthy of inspection. In 4 of the districts the judges decided that the crop awarded first prize was not good enough to leave in the Championship, and therefore 18 crops took part in the competition. This Statewide Wheat Crop Championship commenced in 1927 when the Royal Agricultural and Horticultural Society offered as a prize a Silver Challenge Shield to the value of 50 guineas and annually a small replica of the shield valued at 5 guineas. The conditions laid down by the Society and agreed to by the Government in accepting this very generous offer, were as follows:—

1. The prizes go to the person exhibiting the best crop in the Competition supervised by the Department of Agriculture, the Silver Challenge Shield to be held for a period of 12 months immediately succeeding the award and the silver replica to become the absolute property of the winner.

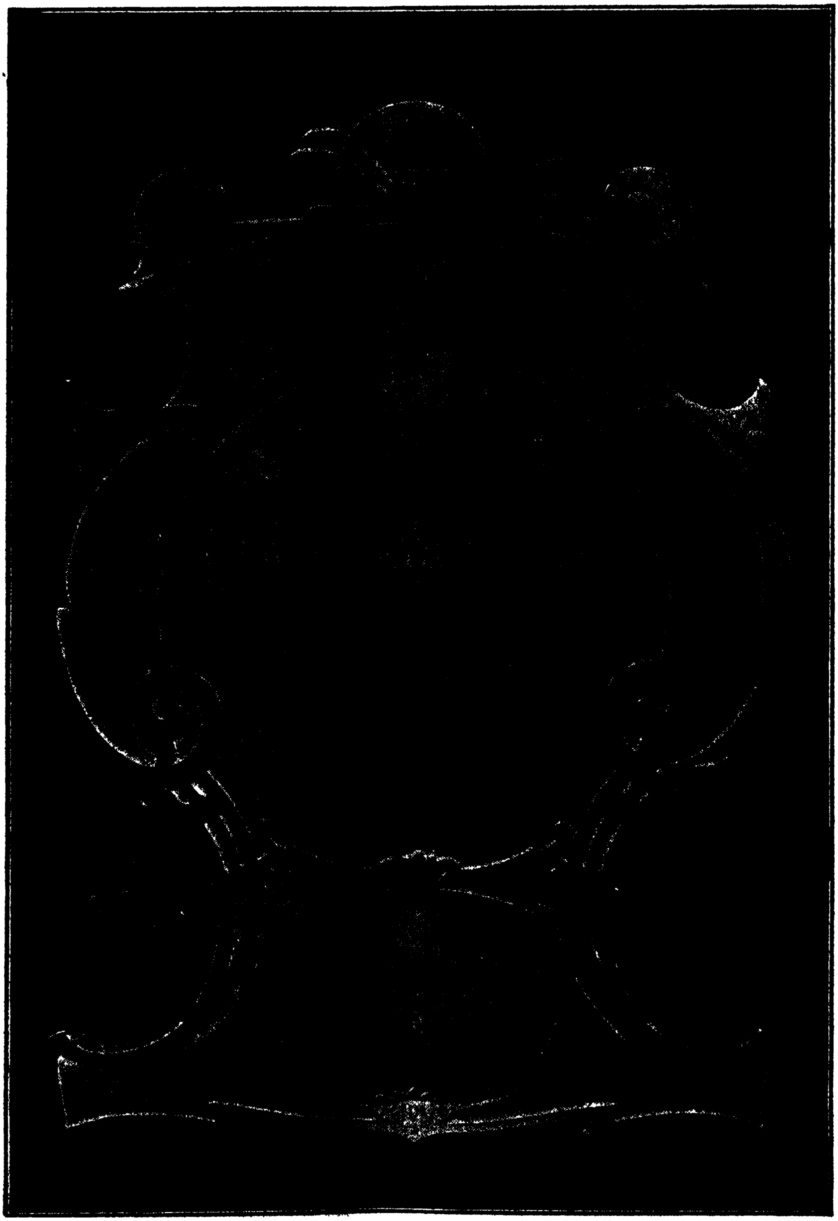
2. The Challenge Shield with the name of each year's winner engraved thereon to be exhibited in the Town Hall or Institute nearest the farm on which the winning crop was grown.

3. The crop awarded first prize in each supervised District Competition to be taken as an entry for the Championship Competition, except in any case in which it is

thought by the judge of the District Competition that the winning crop is not of sufficient merit to warrant inspection for the Championship trophy.

4. All entries for the Championship to be inspected by one judge. Such inspection to be undertaken in each district soon after the district judge has made his awards, but not before the crop has ripened.

5. Each competitor for the Championship to be required to stage one bag of grain and one sheaf (about 1ft. in diameter) of grain in the straw at the Royal Spring Show following the Competition.



Challenge Shield, donated by the Royal Agricultural and Horticultural Society, Won by E. V. H. Wilsdon, Andrews.

WINNERS OF THE CHAMPIONSHIP WHEAT CROP.

1927	F. V. Trenorden	Bordertown (Federation wheat)
1928	F. Coleman . . .	Saddleworth (Leak's Rust Proof and Fondling wheats)
1929	F. V. Trenorden	Bordertown (Bena wheat)
1930	H. C. M. Pilgrim	Wolseley (Gallipoli wheat)
1931	A. M. Dawkins	Gawler River (Ford wheat)
1932	J. P. Carrigg . .	Hamley Bridge (Sword wheat)
1933	H. Michael . .	Hilltown (Dan wheat)
1934	P. McD. Smyth	Salter's Springs (Sword wheat)
1935	W. H. Watkins	Yeelanna (Sword wheat)
1936	H. C. M. Pilgrim	Wolseley (Dundee and Ghurka wheats)
1937	E. V. H. Wilsdon	Andrews (Dundee wheat)

The Entries.

The main feature of the crops judged was the poor setting of grain in the ears. It was exceptional to find a high percentage of ears on which some spikelets had set three grains across, whereas it is quite definite that such development is essential for high yields. Quite a number of crops were sufficiently dense and well headed for very heavy returns if they had been better in this respect, but on account of the relatively poor grain formation the yield was materially reduced. At the same time several entries promised yields within the vicinity of 40 bushels to the acre, which under the circumstances was very creditable.

The unfavourable weather in late September and October was no doubt the cause. Practically no rain fell during this period and grain setting suffered accordingly with the hardy varieties such as Waratah and Early Gluyas filling the best ears. Weather conditions also affected the plumpness of the grain, which on the average was not up to the standard of the usual Championship crops. In a few instances rust reduced the quality, whilst the wet weather of early December caused a certain amount of bleaching.

Despite the fact that some very heavy crops were judged after the rains of late November and December, practically no lodging or loss of grain was noted and with modern harvesting machinery full returns would probably be gathered.

Weeds were not a serious factor, the good seeding conditions and strong early growth of the crops keeping them in check. Exceptions occurred in a few cases where both wild oats and charlock were in evidence, but on the other hand the best crops were particularly clean.

Very little harm had been done to any entry by disease. There was a fair amount of both loose and flag smut showing with bunt present in one crop. Rust had caused a pinching of the grain in some instances, but as a rule this disease had not developed to a serious extent. With three of the entries more than one variety was exhibited and in all 22 plots were examined. Sword was the most popular type, five fields being of this variety. Four were planted with Dundee, four with Ranee, three with Waratah, two with Baringa and single plots with Ford, Geeralying, Gluyas and Nabawa. With a State wide competition including varying soil and rainfall conditions, it is natural to find a number of varieties planted, but of the above Geeralying is the only one which is not widely grown.

Only the winning entry in each District Competition was judged and in the majority of cases the margin of points in favour of this crop over the other entries in that district was very small, indicating that good general average crops prevailed rather than a few outstanding ones. This increased the difficulties of the district judges, but meant better average returns for the district as a whole.

The Awards.

The Championship crop is judged on the same scale of points as the District Competitions, namely 35 points for apparent yield, 25 for freedom from weeds, 20 for freedom from disease, 15 for trueness to type and 5 for evenness of crop. When commenting upon the entries, however, it has been customary in the past to place only the first, second, and third crops in their respective positions. The remainder are not shown in order of merit, but alphabetically according to the name of the exhibitor. The same practice is adopted this year and the placed crops are:—

First—Mr. E. V. H. Wilsdon, Andrews (Dundee).

Second—Mr. J. E. K. Ridgway, Wolseley (Dundee).

Third—Mr. C. S. R. Shackley, Owen (Sword).

The crop exhibited by Mr. Wilsdon was considered the highest yielder in the competition and the additional points so gained were sufficient to place it ahead of that entered by Mr. Ridgway. As a matter of fact, yield had the greatest influence in deciding the position of the placed crops. That shown by Mr. Ridgway was particularly free from weeds and in this respect slightly superior to the winning entry, but not sufficiently so to make up for the difference in yield. The first and second crops were equal in the matter of disease and type. They were both free of smut of any kind and only carried a little rust together with a few plants affected by take-all.

Dundee variety was planted in each instance and this was of good type, including only an odd plant of white chaffed or brown bearded wheat. Both of these were excellent crops well worthy of Championship honours, with the winner promising slightly more wheat to the acre than the other.

Mr. Shackley also had a very fine crop of Sword that filled third position. This entry gained slightly lower points in all sections than those placed above it, but nevertheless was a very creditable exhibit, particularly when the difference in the agricultural conditions of the respective districts is taken into consideration and showed evidence of very sound farming methods.

Championship Wheat Crop (Dundee).

E. V. H. WILSDON, Andrews.

The Championship wheat Crop Competition of the State for season 1937-38 was won by Mr. E. V. H. Wilsdon with 50 acres of Dundee wheat. Mr. Wilsdon's farm is situated about 15 miles north of Clare and 3 miles to the west of Andrews railway station.

Mr. Wilsdon's crop was successful in winning the Midlands Wheat Crop Competition against particularly strong opposition and was well worthy of gaining the Championship. It was good in all respects and with more favourable weather in October so as to permit full setting of the grain in the ears would have given an extremely high grain return. Despite this fact, however, it still promised an excellent yield, probably exceeding that from any other crop in the Competition. Weeds were not numerous, only a few scattered saffron thistles and wild oats being noted. The plants were particularly free from disease, the little rust and take-all present being insufficient to have any material effect upon the grain return, whilst although heavy rainstorms had occurred when the crop was almost ripe, they had not caused damage or knocked it about to such an extent that any appreciable harvest loss could be anticipated.

With regard to trueness to type, the entry was not quite perfect, but at the same time was reasonably good, as there was only a very small percentage of white chaffed and brown bearded plants present.

The land on which the crop was grown was gently undulating, being situated at the foot of fairly steep hills and over the past five years had been worked on a bare-fallow wheat rotation. It was fallowed with a combine behind which harrows were drawn during the first week of June, cultivated and harrowed again early in September and irregularities in the surface smoothed out by railway irons in the following month. A further cultivation and harrowing were given in October, December and May, whilst 81lbs. of Dundee wheat that had been previously graded and dry pickled, together with 153lbs. of 45 grade superphosphate per acre were combined in on 19th and 20th May, with harrows immediately following the seeding implement.

The significant features of this treatment are—early fallowing, regular tillage given when of most value, the use of graded seed and an adequate dressing of superphosphate. The results obtained indicate the soundness of such methods and Mr. Wilsden is to be congratulated on the dense clean crop with which he was successful in gaining the 1937-38 Championship.

J. E. K. Ridgway, Wolseley (Dundee).

This very attractive crop had felt the severe late spring weather and not only had the ears failed to develop as many grains as might have been the case, but the grains themselves were slightly pinched. This had a considerable effect upon the yield as the crop was sufficiently dense and well grown to have produced at least 25 per cent. more grain than was showing at the time of inspection. It gave every indication of very sound soil preparation and was one of the cleanest crops exhibited. There were a few slender thistles, wild oats and brome grass plants to be found, but these were by no means numerous. Disease did not play any part in depreciating the yield, as although there was a little take-all and some rust on the flag the damage was not sufficient to affect the crop return. The variety was practically free from impurities and only an occasional white chaffed or brown bearded wheat was found mixed with the Dundee.

The land had not been overcropped and had remained out as pasture for four years prior to being fallowed in August, 1936. After good tillage throughout the year it was planted with 60lbs. of Dundee wheat and 120lbs. of superphosphate to the acre at the end of May. All the work had been very carefully done and little land had been missed at seeding time.

This excellent crop was awarded first prize in the Tatiara Competition and reflected great credit upon the exhibitor.

C. S. R. Shackley, Owen (Sword).

Whilst not such a heavy yielding crop as some of the other entries, the 50 acres of Sword submitted by Mr. Shackley was a very fine area of wheat and was successful not only in winning the Balaklava District Competition, but also in being placed third in the State-wide Championship. It was planted on fallow land that had been preceded by two years of pasture. Ploughing took place in June and after receiving a harrowing in July and September and a cultivation at the end of September and in May the field was seeded with a combine during the last week of the latter month and harrowed. Sixty pounds of graded and dry pickled Sword seed and 150lbs. of 45 grade superphosphate were planted to the acre.

The crop was dense, but the ears were not well filled and consequently the yield was depressed. Weeds were not plentiful, although fumitory was rather thick in patches with some charlock and three-cornered jacks. There was a little red rust throughout the crop, with some loose smut, flag smut and take-all, but disease was not a serious factor. The variety was not quite true to type as it contained a few brown chaffed wheats both bearded and beardless. The drilling was excellent, the whole field being very carefully planted.

Mr. Shackley is to be congratulated on exhibiting such a good crop and the results obtained indicate that very thorough farming methods have been adopted.

Other Entries.

(In alphabetical order.)

L. Boundy, Minlaton (Waratah).

The crop exhibited by Mr. Boundy won the Southern Yorke Peninsula District Competition. It was Waratah variety and had finished better than the majority of other crops, many ears being well filled with plump grain. It was a little irregular the crop on some of the stony patches being rather thin, but nevertheless would average out to a high yielding area of wheat.

There were a fair number of weeds present, including charlock, poppy, wild oats and dandelion. whilst flag smut disease was rather prevalent. The impurities noted were a few white chaffed wheats and an odd plant of barley.

The land on which the crop was seeded comprised portion of what is known as the Stansbury Scrub country and therefore was not of high natural fertility. It had been worked on a pasture, barefallow, wheat rotation and in the year of fallow was ploughed in July, harrowed in July, September, October and April immediately after the field had been cultivated. Early in June 70lbs. of Waratah wheat and 1 cwt. of superphosphate per acre were combined in. This good cultivation resulted in an excellent crop and showed what can be done in this country when the land is correctly handled.

J. Bullen, Yurgo (Sword).

Mr. Bullen succeeded in winning the Russell and Buccleuch District Competition with a very good crop consisting of 50 acres of Sword wheat. It was dense and well grown, but the ears had not set the maximum number of grains due to unfavourable weather conditions. In patches Cape weed and charlock had made strong growth, whilst amongst the diseases some take-all, loose smut and flag smut were noted. The variety being old type Sword, there was an admixture of brown eared wheat and later maturing strains.

Every care had been taken with the preparation of the land and the planting of the crop, 140lbs. of superphosphate together with 60lbs. of seed wheat being applied per acre.

This was an attractive high yielding crop promising a return much above the average for the district and reflected credit upon the farming practices carried out by Mr. Bullen.

H. O. Clements, Yeelanna (Waratah).

The outstanding feature in the crop submitted by Mr. Clements was its freedom from weeds. It was particularly clean, only a few plants of charlock being found on the whole area. This indicated very thorough tillage of the fallow land. The crop was a little irregular, being lighter on the limestone soil at the northern end, whilst the heavy rain had knocked out a little grain. A number of plants were affected by loose smut and it was unusual to find many ears only partially destroyed, the top portion having developed normally and the spikelets on the lower half totally replaced by loose smut spores. As a little bunt was also seen, together with some flag smut and take-all, the crop lost points under the section dealing with freedom from disease.

Nevertheless, it was a highly productive area of wheat and succeeded in gaining first place in the Flinders District Competition against strong opposition.

L. J. Foale, Parilla (Ranee 4H).

This entry won the Chandos District Competition. It was a relatively short crop, but fairly dense with the ears filled with particularly plump grain and promised a high yield for the district. The land had been used for grazing for two years prior to being fallowed in June of 1936. It received good tillage during the year and only a few charlock and wild oat plants were to be found amongst the crop. The variety was reasonably true to type, with some white chaffed and bearded wheat present, whilst a little disease, mainly loose smut, was noted.

This was an excellent District competition crop, but did not promise sufficient yield for a State championship.

K. C. & D. J. Gunn, Mount Cooper (Ranee 4H).

An exceedingly fine area of wheat that won the Robinson District Competition was exhibited by Messrs. K. C. & D. J. Gunn and gained a sufficient number of points to place it well up in the list of Championship competitors.

The land on which the crop was grown lay out as pasture from 1932 until July of 1936, when it was ploughed and then harrowed shortly afterwards. Weeds were kept under control by livestock, together with soil cultivation during October (twice) and mid-May, whilst at the end of that month 75lbs. of graded Ranee 4H seed and 82lbs. of superphosphate were combined in to the acre. A very dense clean crop resulted. The few weeds present included charlock, poppy, wild oats and Nancy, but these were not harmful. There was a fair amount of flag smut attack with a little take-all and few spots of rust, but the disease was not sufficiently severe to have material influence on the yield.

A few white chaffed wheat plants resembling Ford were to be found.

E. H. Hampel, Terka (Dundee).

The Far Northern District Competition was won by Mr. E. H. Hampel with a heavy yielding attractive crop of Dundee. Mr. Hampel has been very successful in the District Competitions of recent years, which indicates the soundness of the methods he adopts, whilst the crop exhibited this year is probably the best of all the entries he has made. The field had been worked on a bare fallow wheat rotation and after being ploughed in July, 1936, received three cultivations and two harrowings before the seed and manure were combined in under good planting conditions at the end of May. A stroke of the harrows after the combine completed operations. All the work had been carried out in a most efficient manner and no land had been missed by the seeding implement. The crop stood well despite the wet weather and carried a dense mass of well filled ears. Some charlock and wild oats were amongst the weeds, but neither these nor the flag smut or loose smut present had much influence upon the yield.

The variety was fairly true to type, only containing a little white chaffed wheat.

E. F. Heinrich, South Kilkerran (Sword).

This crop which won the Mid-Yorke Peninsula District Competition was grown on a four course rotation, namely:—Barley, pasture, fallow, wheat. It was Sword variety and the grain had been graded and dry pickled with Ceresan before seeding. Whilst this fungicide has influence on the smuts of barley it does not appear to be of value for the control of either flag or loose smut of wheat as these diseases were fairly prevalent in this crop.

It was an attractive, high yielding entry, fairly free of weeds, but containing a sprinkling of brown chaffed wheat plants. It had been carefully planted and no wide spaces had been missed by the combine at seeding time.

R. C. Honner, Arthurton (Geeralying).

The crop exhibited by Mr. Honner won the Northern Yorke Peninsula District Competition. Malting barley is regularly produced on this farm and consequently the rotation adopted is a four-course one, namely:—Barley, pasture, bare fallow, wheat. Wild oats were rather bad throughout the crop and were sufficiently thick to have an appreciable influence on the density of the wheat plants. This weed growth, including not only wild oats, but also sheep weed, charlock and thistles, was the weakest feature as otherwise it was a good competition crop, being fairly free of disease, reasonably true to type and promising a high yield of grain. However, so far as the latter is concerned the variety Geeralying is particularly loose chaffed and unless harvested immediately it is ripe considerable loss of grain will occur. When inspected some shaking had already taken place and the longer the crop was left the greater would be the loss. Even if rough weather was not experienced this shaking out would continue as much grain was exposed in the ear, whilst if bad conditions occurred the loss would be tremendous. On this account Geeralying cannot be recommended as a valuable wheat variety in South Australia.

W. K. Oliver, Wasleys (Sword).

This crop which was successful in the Central District would have benefited very materially by a rain during October. On account of the lack of moisture the ears had not filled well, whilst rust had also had some effect in pinching the grain that had matured. It was grown on fallow land that had been preceded by a crop of barley. During the year of fallow the soil had received good tillage prior to planting, which occurred toward the middle of May. Weeds were not a serious factor, only a few charlock and wild oats being present, but rust and flag smut had had some effect in depreciating the yield. Two strains of Sword wheat had been planted, both being of good type and very free from any impurities.

This was the best crop of Sword included in the Competition so far as trueness to type was concerned.

P. Paull, Alawoona (Ranee 4H, Dundee, and Gluyas).

There were three varieties of wheat included in the entry made by Mr. Paull, which won the Alfred District Competition. Gluyas promised to be the best crop of the three and had not burned off in the warm dry weather to the same extent as the Ranee 4H or Dundee. All had been very thick heavy plots earlier in the season, but the unfavourable finishing conditions had thinned out the plants and depreciated the yields, although the three varieties promised very good returns.

The crops were clean except for a little charlock and brome grass and were very free of disease, the only trouble being isolated areas affected by take-all such as are invariably found throughout the Mallee Lands.

A white chaffed wheat was present as an impurity in all varieties and caused loss of points for trueness to type. The fallow land on which the crop had been planted had received thorough attention and seeding operations had been very efficiently carried out.

Rankine Bros., Strathalbyn (Baringa and Waratah).

Messrs. Rankine Bros. succeeded in winning the Southern District Competition with a very fine crop consisting of 40 acres of Baringa and 10 acres of Waratah wheat The latter was rather a thinner crop, although a good setting of grain in the ears had occurred and promised a slightly lower yield than the Baringa. In both plots poppy, charlock, wild oat and cockspur plants occurred, although weeds were not plentiful. Some loose smut, flag smut, take-all and rust disease were to be found, but these were not serious.

With regard to trueness to type, Baringa was really good, containing only an occasional brown chaffed wheat, whilst Waratah contained a rather high percentage of plants carrying white chaffed ears. Every care had been taken at planting time and practically no land had been missed with the drill.

J. Rucioch, Laura (Ranee 4H and Baringa).

This crop which was awarded first prize in the Northern District Competition was grown in hilly land to the south-west of Laura. It included two varieties, namely Ranee 4H, 35 acres, and Baringa 15 acres, with the former wheat yielding the better crop of the two.

The land was fallowed in June, 1936 and received four cultivations and two harrowings during the course of the year before being sown with a combine in mid-May. The crop was dense and well grown, but contained a fair number of weeds, including Salvation Jane, wild oats and saffron thistles. It was not seriously damaged by disease, loose smut and flag smut being present together with a good deal of rust on the flag, but this was not sufficiently prevalent to have much effect. The Baringa was a good clean true to type crop but the Ranee 4H contained some white chaffed and bearded wheats. Both crops had been carefully and evenly seeded.

C. E. Stubing, Yadnarie (Sword).

The winning crop in the Jervois District Competition on Eyre's Peninsula was exhibited by Mr. C. E. Stubing of Yadnarie whose farm is situated 10 miles to the west of Cleve. The 50 acres of Sword wheat was well headed and although lighter at one end promised a high return. In places dandelion had made strong growth and crowded out the crop, but the loss on this account was not appreciable.

It was an excellent competition crop except for the fact that the apparent yield was not sufficiently high to give it a chance in the Championship. There was practically no disease or admixture of other wheat amongst the Sword variety and in every way it showed evidence of the very efficient farming operations carried out by Mr. Stubing.

Todd & Hazelwood, Caliph (Nabawa).

This is the first time that a crop from the Albert District Competition has been considered sufficiently good by the district judge to be worthy of inspection for the Championship. Messrs. Todd and Hazelwood are therefore to be congratulated on producing what may be regarded as the best crop grown in the Albert District since the inauguration of crop competitions.

It was a very fine area of Nabawa wheat which was no doubt helped by the fact that the land had remained out as pasture for four years prior to fallowing. Because of bad weather and rust the grain was a little pinched, but the crop was dense and well grown, indicating that earlier in the year it had promised very high returns. However, it was still good in this respect. It was fairly clean, showing only odd plants of stemless thistle and charlock, but lost points because of a sprinkling of barley and white chaffed wheat plants growing amongst the Nabawa.

H. A. Zweck, Hart (Ford).

The crop exhibited by Mr. Herman Zweck was most attractive, being tall dense and even and yielding a high return of plump bright grain. Its weakest feature was the percentage of brown chaffed wheat, both bearded and beardless, that was mixed with the Ford variety. There was practically no disease except a little flag smut, whilst it was fairly free from weeds. However, in patches charlock had influenced the crop, although this weed was not general throughout the area.

The land had been worked on a bare fallow wheat rotation and the 50 acres of Ford wheat which it carried gained first position in the Mid-North District Competition.

The Baking Quality of Bleached and Sprouted Wheats

[A. J. Farquhar, A.A.C.I., Department of Chemistry, Adelaide.]

The weather conditions during the harvesting of the 1937-38 crop in South Australia have been exceptionally adverse. The finish of the ripening of the grain has been much slower than usual, and rainfalls frequent. The abnormal conditions reduced the yield considerably, bleaching and, in some cases, germinating the wheat to varying degrees.

Consequently, it was possible to obtain samples of grain harvested prior to the heavy rains, and then later samples of the same crop harvested after the rain. Five varieties of wheat grown at Turretfield Seed Wheat Farm and Roseworthy Agricultural College, together with four trade samples from Murray Bridge have been milled and tested for bread making quality.

The rainfall from 27th November to 14th December at the two farms was:—

	Turretfield Seed Wheat Farm. ins.	Roseworthy Agricultural College. ins.
First Rains:—		
Nov. 27	·08	—
28	—	·15
29	·22	·35
30	·51	·71
Dec. 1	·21	·50
2	·13	·26
3	1·44	·06
4	·12	—
5	—	—
6	—	—
7	·05	·05
8	—	·02
Second Rains:—		
Dec. 9	—	—
10	—	—
11	·83	·76
12	·04	·01
13	·03	—
14	·04	—

Particulars of the sample submitted were as follows:—

1. Ranee 4H, Turretfield — harvested 9th December.
2. Ranee 4H, Turretfield — harvested 16th December.
3. Sword, Turretfield—harvested 9th December.
4. Sword, Turretfield—harvested 15th December.
5. Dundee, Roseworthy—harvested 26th-27th November.
6. Dundee, Roseworthy—harvested 16th December.
7. King's White, Roseworthy—harvested 24th-26th November.
8. King's White, Roseworthy—harvested 16th, 20th, and 21st December.
9. Nawab, Roseworthy—harvested 22nd-23rd November.
10. Nawab, Roseworthy—harvested 16th December.
11. Trade A is of badly shot and bleached grain (Murray Bridge).
12. Trade B is of bleached but comparatively free from shot grain (Murray Bridge).
13. Trade C is of the best wheat delivered (Murray Bridge).
14. Trade D is mixture of A and B in equal parts and is the fair average quality of the wheat taken off since the rain fell.

The first effect of these adverse weather conditions was to diminish the yield of flour, the extent depending on the amount of rain damage sustained, the lower yields being obtained with the badly sprouted samples.

Only in one sample (Trade A) was any deleterious effect on the colour of the flour apparent, and this was not spoilt to any great degree. Germination tests conducted show good results and all seed wheat varieties are in good condition for next year's seeding.

In most of the rain-affected wheat there was a decrease in the protein content and the water absorption power has been little affected.

Many varieties of Australian wheat yield flours too low in diastatic power to ensure adequate gas production during the fermentation of the dough. In most of the samples dealt with the large increase in the diastatic power of the "after rain" samples has been definitely beneficial to loaf volume and loaf quality.

BAKING TESTS.

	Basic.		0·3 Per cent. Malt + 0·1 Per Cent. Phosphate.		0·3 Per Cent. Malt + 0·1 Per Cent. Phosphate. 0·001 Per Cent. Bromate.	
	Volume.	Weight.	Volume.	Weight.	Volume.	Weight.
	Mls.	Grms.	Mls.	Grms.	Mls.	Grms.
1. Ranee 4H, before 2nd rain	400	124·6	410	124·1	355	125·0
2. Ranee 4H, after rains....	375	126·1	385	124·8	320	125·1
3. Sword, before 2nd rain ...	425	123·3	475	121·0	415	121·6
4. Sword, after rains	450	122·3	455	120·9	390	123·6
5. Dundee, before rains.....	425	134·6	485	132·5	545	128·5
6. Dundee, after rains	455	129·2	515	127·5	450	130·1
7. King's White, before rains	330	124·5	375	123·2	420	119·4
8. King's White, after rains .	400	124·1	450	123·1	490	119·8
9. Nawab, before rains......	360	125·7	445	123·4	460	123·0
10. Nawab, after rains.......	485	123·4	490	122·8	440	123·2
11. Trade A	440	121·6	440	122·7	310	125·1
12. Trade B	475	123·7	515	122·8	485	122·2
13. Trade C	455	125·8	490	123·6	400	125·9
14. Trade D	470	121·7	475	120·2	435	121·7

The baking tests were all made on the basis of 100 grammes of flour containing 13·5 per cent. moisture.

	Bushel Weight.	Moisture of Wheat as Received.	Germination.	Whole Meal Fermentation Test.	Milling Test Flour Yield.	Analysis of Flour. 13·5 Per Cent. Moisture Basis.		
						Protein Nx 5·7.	Water Absorption.	Maltose Mgms. per 10grm. Flour.
	Lbs.	%	%	Mins.	%	%	%	
1. Ranee 4H, before 2nd rain ..	58½	14·0	99	47	69·2	7·3	53·0	99
2. Ranee 4H, after rains.......	59	13·4	100·0	42	70·4	6·9	53·5	134
3. Sword, before 2nd rain......	60¾	12·5	94·0*	50	72·2	9·3	51·2	103
4. Sword, after rains	59¼	13·4	97·0*	39	72·6	8·3	52·0	186
5. Dundee, before rains........	62¾	10·7	97·0	109	73·5	11·9	62·9	264
6. Dundee, after rains	57¾	12·1	79·5†	102	73·1	11·8	62·3	544
7. King's White, before rains ...	64½	9·5	94·5	36	70·5	13·2	50·6	100
8. King's White, after rains	56¾	13·1	98·0	46	66·5	12·2	51·6	177
9. Nawab, before rains.........	64¾	11·0	98·0	40	69·1	10·2	51·5	73
10. Nawab, after rains..........	57½	13·3	98·0	46	68·8	10·2	51·6	192
11. Trade A	57¼	12·6	96·0	33	70·0	8·6	51·8	550
12. Trade B	58¼	12·8	94·5	34	71·2	9·5	52·2	244
13. Trade C	59	12·9	93·0	41	72·7	8·3	55·7	164
14. Trade D	57¾	12·7	95·0	33	70·6	9·1	52·0	397

* The lower germination in Sword was due to harvesting damage.

† Shows considerable harvesting damage sufficient to account for the drop in germination from that harvested before 10th December.

Harcourt and others (1, 2, 3, 4) have shown with experiments made with American wheats that additions of up to 10 per cent. of germinated wheat could be beneficial—provided that the germination period had not exceeded three days or the plumule had grown to not more than one-half the length of the wheat kernel. Excessive diastatic power as in the after rain Dundee sample, or as in the Trade A sample, will cause slow baking in the oven and in some cases the inside of the loaf will remain sticky. In most cases the loaf may collapse after leaving the oven.

The wholemeal fermentation test figures for the Turretfield and Roseworthy samples show a good correlation with their respective baking quality. Both the King's White and the Nawab samples give an increased test figure after rain and are very much improved from a baking standpoint.

Ranee—Both samples were very weak examples of this variety and bake into very poor loaves.

Sword—The quality of the "after rains" sample was similar to its prototype and both samples produced attractive loaves of good volume, colour, and texture.

Dundee—The diastatic power of this variety of wheat is usually very much above that of most Australian wheats and was increased to a very high level by the bleaching it received, but it still retains its high baking quality. The loaves from each sample had very dark rich brown crusts, and very springy and elastic crumbs of excellent colour and texture. Both samples would be very suitable for blending with flours having a much lower gassing power.

King's White.—This variety was improved by rain to a greater extent than any of the others tested, and gave an increased volume in the loaf of 17 per cent. and also gave a good response on the addition of potassium bromate improver.

Nawab.—Also shows improvement in the texture of the loaf in the after rain sample and also in loaf volume.

Trade A.—Produced a loaf which showed the effect of the high diastatic power. The loaf was shell topped and the whole of the crust dark-brown and rough. The crumb colour was fairly good, but the crumb texture poor. The addition of potassium bromate caused a complete collapse of the loaf.

Trade B.—Produced an excellent loaf in all respects and showed no ill effects from the bleaching which had occurred.

Trade C.—Represents wheat 1 per cent. lower in protein than the usual f.a.q. standard, and produced a loaf of fair quality unresponsive to additions of phosphate and bromate.

Trade D.—The results with this mixture showed the capability of Trade B sample to carry a large proportion of the poor Trade A sample and produce a good loaf of bread.

SUMMARY.

The effects of the abnormal harvesting conditions may be summarised as follows:—

1. Bushel weight decreased by as much as 8lbs. a bushel.
2. Yield of flour slightly lower.
3. Flour colour mostly unaffected.
4. Protein content mostly lower.
5. Water absorption power little affected.
6. Diastatic power increased to a beneficial extent in most samples. Some are excessively high.
7. Baking quality in most cases improved as regards loaf volume and texture.
8. Germination percentage remains high.

In concluding, I wish to thank Messrs. K. C. Paul, B.Sc., and H. T. Robjohns, A.A.C.I., for assistance in conducting the testing of these samples.

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(1) **Harcourt, R.—On The Quality of Flour.** Ontario Agr. Coll. Report for 1911.

(2) **Olson, G. A.—Wheat and Flour Investigations.** Wash. Agric. Exp. Station, 1917, Bull. 144.

(3) **Thomas, L. M.—Characteristics and Quality** of Montano Grown Wheat, 1917. U.S. Dept. Agr. Bul. 522.

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Marketing of Australian Eggs

Investigations carried out in South Australia on quality defects

(Paper written at the request of the British Association of Refrigeration for a Symposium on Eggs and Poultry Storage, in London.)

[By C. F. ANDERSON, Chief Poultry Adviser, Department of Agriculture, South Australia.]

The poultry industry in Australia is one of the important primary industries, the net value of the production for the year 1935-6 being £5,867,781. The stock statistics for each State in that year were as follows:—

	Fowls.	Ducks.	Geese.	Turkeys.
New South Wales	5,263,271	201,844	29,630	232,229
Victoria	5,496,969	292,882	39,283	113,966
Queensland	1,182,343	38,719	4,339	10,132
South Australia	2,040,025	57,522	19,560	60,799
Western Australia	1,386,035	28,293	2,395	25,586
Tasmania	450,000	35,000	10,000	10,000
Total	15,818,643	654,260	105,207	452,712

The estimated gross value of the production of eggs and poultry for the year 1935-36 was as follows :—

	£
New South Wales	3,701,692
Victoria	3,600,671
Queensland	551,175
South Australia	752,945
Western Australia	600,769
Tasmania	364,370
	£9,571,622

During recent years Australia has made very rapid progress as an exporter of eggs to Great Britain, and for the year 1936, the exports to British markets were 17,365,132 dozens of eggs in shell, and 290,612lbs. of egg pulp.

Methods of Production.

The production of eggs can be divided into three principal sources:—

1. Commercial poultry breeders.
2. Side-line producers.
3. Producers who give very little attention to the birds.

1. Commercial Egg Producers.

Commercial egg producers are those who rely solely on the returns from poultry as a means of livelihood. The size of the farms varies considerably in each State. What is termed a "one-man farm" would carry from 1,200 to 1,500 adult stock. There are hundreds of farms with from 3,000 to 5,000 adult birds, many farms carrying from 20,000 to 40,000 head of poultry, and the largest farm in Australia is one with 200,000 head of adult birds. The majority of the principal commercial poultry plants are self-contained, that is, they are completely equipped with incubators, brooders, growing equipment, housing, &c.

2. Side-line Production.

This branch of poultry keeping plays a very big part in the poultry industry of Australia, and it is fairly safe to say that, by far the greater part of the production follows along these lines. By side-line production is meant the keeping of poultry as an adjunct to other lines of primary production, such as wheat growing, dairy farming, fruit growing and vegetable production. The size of the flocks kept as side-line production would average from

300 to 500 adult birds. The general practice for stocking on these farms is by the purchase and rearing of day old chickens, or by the purchase of eight to ten weeks old pullets.

The keeping of poultry by suburban householders is also practised on a large scale in Australia. Thousands of homes throughout Australia keep from twelve to twenty birds for the supply of the requirements of the household.

Breeding Season.

The breeding season in Australia is a comparatively short one, this being principally due to climatic conditions. Incubators are generally started on the first of July and the final batch completed by 30th September. Incubation is largely done by means of the all-electric type of incubator, ranging in capacity from 1,000 eggs to 20,000 eggs.

Breeds.

It is surprising the small number of breeds favoured by egg producers throughout Australia. The White Leghorn is by far the most popular breed, and it is reasonable to suggest that on commercial poultry plants from 75 to 80 per cent. of the stock would be of this breed. Next in popularity would follow the Australorp, Rhode Island Red, and the Light Sussex —which is now gaining favour.

Housing.

The methods of housing adopted in Australia are practically confined to the intensive and semi-intensive systems. There has been during recent years, a definite trend in favour of the semi-intensive system. Where ample land is available, there is no doubt that the health and stamina of the stock are better where they are kept under these conditions.

Feeding.

In a big wheat producing country like Australia, wheat and its by-products form by far the greatest part of the food of the poultry. Barley and maize are used fairly extensively in some of the States where such crops are grown. Green fodders also form a large part of the diet. In some of the States where particularly hot seasons are experienced, up to 60 per cent. of the morning mash is chaffed greenfeed. The methods of feeding do not take a particularly wide range, and are in order of popularity as follows:—

Wet Mash.—Morning—Mash, composed of bran, pollard, chaffed greenfeed, meat meal, salt and grit. Mid-day—Wheat. Evening—Wheat.

The average maximum quantity of food consumed per bird a day would be 2ozs. mash in the morning, 1oz. wheat at midday, and 1oz. wheat at night.

Dry Mash.—This is provided in hoppers and the birds have access to it at all times. The ingredients are generally the same as that of wet mash with the exception of the greenfeed. This is fed separately. The quantity of mash consumed under this system is a little more than where wet mash is used, but the quantity of whole grain is probably a little less than under the wet mash system.

Soaked Grain.—This method of feeding has rapidly found favour on a large number of poultry plants throughout Australia. The system adopted is to soak the wheat at the rate of 8lbs. per 100 adult birds for 24 hours. The wheat is placed in buckets or tins and covered with water until the water is 2ins. above the wheat. After soaking for 24 hours the surplus water is drained off and the chaffed greenfeed, meat meal, shell grit, &c, added. The soaked grain is fed twice a day, no other feeding being followed.

Sexing.

The "sexing" of chicks at day old is extensively practised throughout Australia. There are several competent Australian "sexers" available. Examinations are conducted regularly by the Governments in the various States. The standards adopted are as follows:—

Special Certificate.—For those who are able to "sex" 300 White Leghorn chicks in 45 minutes with an accuracy of 98 per cent. and without killing a chicken or causing injury.

First Class Certificate.—For those who are able to "sex" 200 White Leghorn chickens in 30 minutes with an accuracy of 95 per cent. without killing a chicken or causing injury.

As mentioned previously, the White Leghorn is the most favoured breed in Australia, and as there is very little demand for the White Leghorn cockerels outside those required for stud purposes, "sexing" is very popular. The majority of White Leghorn chicken cockerels which in years prior to "sexing" were a loss to the average poultry breeder, are now destroyed at day old.

Marketing, Storage and Quality Faults.

Marketing and improving the quality of the egg and its products are matters which have engaged special attention during recent years. Particular attention has been given to those features by the writer of this paper, and considerable work has been done; although several faults have been found in eggs, and the probable causes of some of these faults discovered, the remedies are indeed obscure up to the present. In giving some details of the methods of production the object was to show the advantages enjoyed by the average Australian poultry producer, such as ample ground for the keeping of poultry, abundant sunshine with resultant good growth of pastures and green fodders, and the plentiful supply of all food required. The methods of marketing vary greatly in each State of the Commonwealth. Some of the States, with bigger populations, such as New South Wales, and Victoria, import supplies from the other States during the low periods of production. There is, however, during the months of July to December, a surplus of eggs throughout Australia, and the majority of these are exported as eggs in shell to Great Britain. Packing for export commences during July and terminates towards the end of November. Very rigid regulations are laid down by the Commonwealth of Australia in regard to the quality and grades of eggs packed for export, and graders are in constant attendance on the egg floors during the export season. In addition, a certificate is issued by the Commonwealth Government for each shipment of eggs stating that the quality, grade and methods of packing were up to the standard demanded by the regulations at the time of shipment. In Australia, with its long distance marketing, together with seasonal weather experienced, quality and storage play an important part in the marketing of eggs. For instance, for local consumption, storage generally commences during December, and supplies are frequently held in storage up until June, when the new season's production increases rapidly.

The average commercial poultry producer collects the eggs at least twice a day, when they are cleaned and stored, generally in an underground room, and marketed twice a week. On arrival at the packing floors the eggs are candled and classified into various grades. The principal faults found in eggs in Australia at the time of candling prior to storage are watery white, floating yolks, and weak shells, while the principal faults found when candling after the eggs have come out from storage (generally from three to five months) for local consumption, are stuck and sided yolks, dropped yolks, red rots, black rots and to a lesser degree, green whites. The general practices of storage are to test the eggs prior to storage, when they are packed in 30doz. cases in fillers held at a temperature from 33 to 34 degrees, and with a humidity not exceeding 80 degrees. It has been proved that when the humidity exceeds 80 degrees, there is a serious risk of mould.

Bacteriological Investigations.

Bacteriological investigations have been carried out by Dr. A. E. Platt, M.D. (Adelaide), D.T.M., D.T.H. (Sydney), Dip. Bacteriology (London)—Lecturer in Bacteriology, University of Adelaide, and Deputy Director of the Institute of Medical and Veterinary Science, who has furnished the subjoined notes.

1. On the many "faults" which have been recognised during the past few years, three have been studied by the writer, viz.:—Watery white, "floating yolk," and the relationship of humidity to mould growth on the shells.

1. Watery White.

In order to ascertain to what extent the watery white condition was responsible for eggs being rejected from first quality, work was commenced in South Australia in 1935 (*vide* Bulletin 308 by C. F. Anderson). A study of the results show that from a total of 439,056 dozen eggs supplied for the period of 12 months, 2.71 per cent. were rejected for the condition known as water white. The eggs were received from distances varying from three to four miles from the packing floor to 150 to 200 miles. It is interesting to record that the highest percentage of watery white, 7.15 per cent. was from eggs received from 50 to 150 miles from the packing floor.

Climatic Conditions and their effect upon the Watery White Condition.

A study of the results of the condition each month shows that the highest percentage was 34.50 during the month of March. A reference to the temperature table shows that the average monthly maximum temperature for that month was 88 degrees. This period also corresponds in Australia with the low period of production, as the moulting period is then well advanced, and the general condition of the stock is not conducive to the production of the highest quality egg.

The general conclusons arrived at were:—(*a*) That packing and transport had a decided influence on the question of watery white, and in all the work done the eggs were packed in cardboard fillers with the air cell end up. Transport was principally by railway and road. On the railway, special provision was made by placing straw mattresses on the floor and packing at ends and sides of van; also between each tier of cases plenty of packing was used. Where road transport was used, the eggs in the majority of cases were collected at the farm and transported direct to the packing floors. (*b*) That climatic conditions were an important factor. (*c*) That the condition of the stock was also an influencing factor.

It has also been proved that a percentage of the eggs with the defect known as "watery white" was laid in that condition, and with that in view, the question of nutrition is now being closely studied, and various feeding experiments are in progress at the Government Poultry Station at Parafield, South Australia, to determine the effect of feeding on this defect.

2. "Floating Yolk."

With regard to this condition, there seems to be a considerable amount of confusion arising principally from the use of numerous terms to describe the same or various stages of the same condition. It would appear, for example, that the terms "stuck," "sided," and "dropped yolks" probably indicate the same condition as that described by Halnan and Day (1935) and Anderson and Platt (1936).

This condition is a definite entity, and is characterised by a marked increase in the mobility of the yolk when the egg is candled. In addition to a mobile yolk, one may often see also the shadow of a freely movable appendage which upon breaking the egg, is seen to be an enormously enlarged and oedematous chalaza which although generally remaining attached to the vitelline membrane, has been freed from its shell attachment. Sometimes both chalazae are pathological. In most cases the yolks appear normal. Sometimes, especially in this type of egg which has been in cold storage for several weeks, there is a definite darkening of the yolk colour, which in many cases was associated with a partial coagulation of the proteins, giving the yolk a "candied-honey" or "lemon-cheese" appearance. In extreme cases, besides this partial coagulation of the main mass of the yolk, small plaques of dried or inspissated yolk are found adherent to the vitelline membrane. In a small percentage of eggs the yolk appeared brownish-green in colour, and in these cases, there is an associated partial liquefaction of the yolk.

In the great majority of these eggs the white appears slightly opaque, either throughout the whole of the white or, more frequently, in a zone immediately surrounding the yolk. The most striking change, however, and one which is present in all affected eggs, is noticed in connection with the chalaza or suspensory ligament of the yolk. One or sometimes both show considerable enlargement with marked increase in opacity of the egg white immediately surrounding it. The normal spiral arrangement, if still present, is less marked than normal, but in most cases is absent. The distal end (the end nearest the shell) is always ragged in appearance and shows signs of partial digestion.

If such a pathological chalaza is examined microscopically, it will be seen that the interior of the chalaza contains micro-colonies of Gram positive organisms of the Genus Bacillus. From the evidence available, it seems that these organisms gain entrance to the egg higher up in the oviduct of the hen and having proteolytic powers, leads to proteolysis of the chalaza with subsequent increased mobility of the yolk which is then free to settle to the "bottom" or rise to the "top" of the egg when held stationary for some time in storage. The "stuck" or "sided" terms are descriptive of this stage.

At present it is not known whether this organism is the primary etiological agent or merely a secondary invader. It does however, seem fairly certain that it is responsible for the liquefaction of the proteins of the chalaza. Further investigations are being undertaken to determine the exact relationship of this organism to the condition and also to determine methods of control.

3. Relationship of Atmospheric humidity to growth of moulds in eggs in cold store.

A reference to the literature shows that there is considerable diversity of opinion with regard to the optimum relative humidity for eggs in cold storage. With a low humidity value, there is excess transpiration of moisture while with high humidity value the surface of the eggs is rendered suitable for the growth of moulds. Unfortunately the margin between an upper and a lower limit is small, and a suitable optimum is often difficult to maintain, especially in store rooms which are constantly being opened to remove from or add to the stocks.

From observations made at one large plant, it would seem that the degree of humidity often recommended, viz., 80 per cent., is too high and that mould growth was not controlled until the humidity was reduced to 75 per cent.

Wireless Talks

The Importance of Good Quality Cream to the State

An address broadcast through 5CK by H. J. Apps, Senior Dairy Adviser.

A great deal of attention has lately been focussed upon the butter industry, and the necessity of improving the quality of the cream delivered to the factory is apparent. The education of the cream supplier to observe the fundamental rules governing the production of good quality cream is nullified unless manufacturers are prepared to pay a premium for a better product.

After 30 years' experience in this State, from the handling of the raw product until the finished article is placed on ship, I venture to say that there are certain well-defined lines upon which improvement could be hoped for, such as a better raw product, a greater difference in price between choicest and pastry grades, and farm instruction supported by the necessary legislation. It is imperative to abandon the theory that all cream is of one quality, or that it is possible to raise the whole cream supply to choicest grade. Differentiation between the various grades of cream so that the producers of sound quality may be remunerated for the additional labour and expense is essential. The principle of cream grading is sound, but unless there is a greater margin in prices it offers no reward to those farmers who take the necessary care to produce a better and cleaner product.

Payment according to quality has so far received a very limited degree of recognition in the cream supply. The efforts of suppliers of high quality cream to secure their commercial position and to obtain prices which remunerate them fairly for the extra labour and expense, have focussed attention upon the principle of paying for quality and upon the policy of paying something more for an article guaranteed to be of a higher standard than the ordinary product.

There being so little difference in price between a good and an inferior cream, there is little incentive for the farmer to strive to effect improvement. For instance, under existing conditions, a dairyman may supply a 5gall. can of cream which contains 20lbs. butterfat; such cream may be the product of a careful supplier and delivered in a sound condition. On the other hand, the indifferent person may forward a can containing the same amount of butterfat, but this cream may be cheesy or tallowy in flavour, fermented, or even a week old. Yet this supplier is only penalised to the extent of 10d. on a can of 5galls. I still maintain that if the difference were 3d. per pound of fat, instead of ½d., or 5s. on the can, it would induce the supplier of the inferior cream to ponder over the matter.

It has frequently been stated that the payment of a premium for high-quality cream is economically unsound, under present marketing conditions, as the equivalent is not received for the butter when sold. There is another important aspect to the matter—the supplier of good quality cream helps to build up a reputation for our product. A great increase of good cream during the summer months would obviate the necessity of having to import butter. In the export trade our butter has to compete against the world's best; therefore, when the quality of the butter is allowed to fall off, business is actually imperilled. An improvement in the quality of the butter would tend to create a greater consumption, and it is quite within reason to raise the average consumption from 5lbs. to 8lbs. per head per year. Improvement in the class of cream will do the same with butter, and this must cause an increase in value, as the demand for a good butter is greater than the demand for a poorer article. Flavour and odour are important factors in the consumption of any food; hence, the production of a better product has an economic significance which no dairyman should overlook.

The results achieved by our local manufacturers in competition with butter manufacturers of the world, conclusively prove that, with the right class of raw product, they can make butter of perfect quality. In the manufacture of butter of high quality the use of cream that has a good flavour and smooth texture is necessary. The flavour of a large percentage of the cream received in this State is such that butter of only mediocre quality can be made from it.

With poor methods, regardless of how good the equipment may be, it is impossible to produce a good quality cream. In the first place, cream is the product of milk, and as milk is one of the most easily contaminated foods we have, and as it is also one of the best mediums for the growth of many types of bacteria, it is important that great care must be taken in its production, in order to prevent contamination from filth, flies, &c., which carry thousands of bacteria. It is also important to prevent the growth or development of the few bacteria which are invariably in milk, even though produced under the best regulated conditions.

A mistaken idea has developed in the minds of many farmers that to produce sanitary milk it is absolutely necessary to have expensive sheds and bails. As a matter of fact, many of the dairy sheds where sanitation is the primary object, are quite inexpensive. If the cow shed is conveniently arranged and made to embody the most accepted sanitary features, the work may be performed under better conditions, and there is less risk of contamination taking place. Badly constructed floors and yards, and the non-removal of manure are not conducive to high quality products. I might here mention that any farmer desiring plans of cow sheds can obtain same from the Department of Agriculture free of cost.

If no foreign materials enter the milk during any stage in the production and handling, obviously there would be no need for straining it. However, as every dairyman knows, it is difficult if not well nigh impossible, to handle milk under practical farm conditions and not collect some foreign materials at some time. Hence, a strainer is desirable to catch such materials. Obviously, a strainer should not be a source of contamination, which it is if proper precautions are not observed. Wire or screen strainers will harbour bacteria in the same way as any other dairy utensils; hence, they should be cleaned and sterilised. The use of cloth strainers cannot be recommended, because they are difficult to clean and sterilize under farm conditions. If this is not done, the strainer cloth will be a most potent source for bacterial contamination. The mesh of the cloth strainer holds a considerable quantity of milk which cannot be entirely washed out with cold or merely warm water. When this strainer is hung up in a warm place during the day, bacteria could not find a more favourable place to grow. For proof of this, notice the smell of an unscalded strainer on a particularly warm day. It has an odour between sour milk and decaying cheese, which is caused by the spoiling of the milk left in the cloth. There are millions of bacteria there ready to go into the can with the fresh milk, and subsequently cause "off flavours" in the cream. The most sanitary and effective method of straining milk is to use cotton filter pads, placed between two layers of wire gauze. These pads are discarded after being used, and need no further attention.

It is necessary to observe two general principles in keeping cream sweet for some time. These are cleanliness and coldness. To comply with the first means that the bails, cows, milk utensils, and separator must be kept clean. To meet the requirements of the second means cooling at once to as low a temperature as is possible. If cream of good quality is to be obtained, it is imperative that the separator must be thoroughly cleaned after each separation. If not washed and freed from all remnants of milk of the previous separation, the separator becomes a seat of contamination, and a source of unclean and filthy cream, the disastrous consequences of which no subsequent treatment or care of the cream can overcome. On the other hand, milk produced under insanitary conditions will not produce a good cream, even if passed through a clean separator.

Milk should be separated so as to produce a cream containing 35 per cent. to 40 per cent. of butterfat in the winter, and from 40 per cent. to 45 per cent. in the summer. High testing cream, such as 50 per cent. and over, has no advantages, either in the factory or to the dairyman; in fact, it causes a loss to the farmer, in so far as there is the risk of loss of fat in separation—there is not sufficient milk present to cause a uniform ripening, and the tendency of such cream is to develop a tallowy flavour. If cream is properly stirred with a tinned metal stirrer, it will cause the milk to be uniformly incorporated throughout the mass, and will be uniformly ripened. High testing cream which is not stirred results in the milk being deposited at the bottom of the can. Should this milk become thick, it is impossible to obtain a truly representative sample for testing. This defect is not infrequently the cause of irregular and incorrect cream tests. The thickness of cream may be regulated to the desired consistency by adjusting the cream screw.

Cooling cream on the farm promptly and properly would prevent, to a very large extent, the enormous quantity of inferior cream which is produced every year. Cooled cream retards bacterial increase and preserves quality, and if frequently stirred, keeps the cream in a better mechanical condition.

Should the dairyman, who wishes to produce a good cream, keep ever before him the fact that warm cream absorbs odours as readily as a sponge takes up water, he will profit by it. Many odours are not objectionable in themselves, but when imparted to cream, are highly so. Fruit and vegetable odours are not objectionable, yet when absorbed by cream, are very unpleasant. The importance of efficient cooling of the cream as it leaves the separator is second only to cleanliness. Putrefactive germs which may find their way into the cream, even in the cleanest dairy, will be largely checked by efficient cooling. Strong animal odours will also be minimised but the results of cooling are negative with dirty appliances. To obtain the best results, the operation must be carried out in clean surroundings. Prompt cooling is not possible by merely letting the cans stand in the open. The cream should be run over a cooler and the can should be set in water, surrounded with a clean cornsack which is frequently wetted. Never run warm cream into cold cream, because "off" flavours are sure to occur.

It is often a problem to know where to store cream on the farm. The ideal place is a milk house. Without such a room, cream is stored in various places, and very often with poor results.

Cream should be delivered to the factory as often as possible. A minimum weekly schedule of thrice in summer and twice in winter is recommended. The more frequent the delivery or collection of cream, the better will be the quality of butter produced. Protecting the cans with wet bags during transit or waiting the collection lorry is necessary. It is considered that when cans are allowed to remain even for 20 minutes in the direct sunlight the cream is impaired in flavour. Every farmer should therefore erect a shelter to protect the cans until collected.

The surface of most dairy utensils is tin with which milk comes in contact; therefore all joints should be properly made. All utensils should be cleaned immediately after use, and on no account should milk be allowed to dry upon them. The cleansing may be best accomplished by first washing in cold or slightly warm water, then hot, and finally rinsing in boiling water. If steam is available, the vessels may be put over a steam jet; so much the better. A good scrubbing brush is preferable to cloth for removing the particles of milk from the utensils. Providing the utensils have been subjected to boiling water or live steam, they do not require wiping with a cloth, if placed where they can air properly. The evil caused by improper attention to the cleaning operation may be attributed to the fact that while the utensils are not in use, bacteria are feeding and multiplying on the dirt left behind. Further, imperfectly dried utensils will cause them to develop rust. One of the chief sources of metallic salts, for which the dairyman is sometimes responsible, is the use of rusty buckets, separator, and cans. When iron rust dissolves in the lactic acid, which all sour cream contains, it imparts a strong metallic taste to the cream, which has a deleterious effect upon the butter.

With fresher, cleaner, colder, and better flavoured cream delivered regularly to our factories, the quality of our butter can be still further improved. Cream production is like a chain made up of many links, and the final result is no stronger or better than the weakest link which limits the profit.

In conclusion, let me impress upon dairymen to observe the following points:—

(1) Cool the cream as it leaves the separators, and keep it cold until delivered.

(2) Keep the cream in a pure atmosphere and not stored with other products.

(3) Do not mix creams until they are of the same temperature.

(4) Stir the cream several times daily with a tinned metal stirrer.

(5) Deliver the cream as often as possible, preferably every second day.

(6) Protect the cans of cream from the sunlight during transit.

(7) Use boiling water or steam for final operation in washing utensils.

Sudan Grass—Poisoning Danger

[Extract from the *Farmers' Weekly*, Bloemfontein, South Africa.]

Sudan grass has recently attained great popularity as a summer silage and grazing crop for dairy cows in America. The few tests carried out in South Africa have also shown the value of this crop when it is grown to take the place of veld which so quickly loses its feeding value after the first summer rains.

Sudan grass has the great virtue of being very drought-resistant and of yielding big quantities of fodder per acre, but it also possesses the serious disadvantage of developing prussic acid and of, therefore, being poisonous to stock during certain stages of its development or in extremely dry weather. This one drawback is, however, receiving increasing attention on the part of American research workers and the following contained in "Hoard's Dairyman" shows what has so far been done in the United States to eliminate this danger.

Colour and Poison.

It was once thought the purple Sudan was more dangerous than the green, but indications now are that the deeper green is likely to be more dangerous than the green carrying a yellow tint. The explanation for this, and one of the interesting things the Wisconsin Experiment Station is finding, is that the soil may contain relatively more nitrogen than phosphorus.

Prussic acid is made of carbon hydrogen and nitrogen. When there is an abundance of phosphorus, or when there is a balance of phosphorus and nitrogen, the Sudan is not likely to develop as much prussic acid. Land that is low in nitrogen and rich in phosphorus is not likely to produce Sudan with as much prussic acid in it.

When 6 animals were turned on a second growth of Sudan pasture containing a high percentage of prussic acid, each one was watched closely. It was observed that the most grazing was done on the deep-green Sudan, which indicated that it was more palatable than that with a yellow tinge. The animals ate for 10 minutes and then all of them stopped. Five of them walked as far as they could go in the pasture, stopped, and began to eat a little bluegrass which was along the fence.

Saved by an Injection.

One animal stood still for a few minutes, finally lay down, and began to breathe very rapidly. Attempts were made to get her up, but she was unable to get to her feet. In a few moments her head dropped to the ground—her eyes rolled back. Evidently she had eaten enough Sudan to kill her. A veterinarian who was present gave her a dose of sodium thiosulphate intravenously. In less than a minute she raised her head and lay in a normal position. In about half an hour she was able to get to her feet and walk to the truck that had brought her there for this test.

In the meantime, 4 of the other animals had lain down, but they had not consumed a sufficient quantity of prussic acid to kill them. None of the five were treated. In about an hour they had all recovered sufficiently to be loaded on the truck and taken away.

Cow Intuition.

In another trial Sudan containing a high percentage of prussic acid was cut with a lawn mower and fed to two animals. After eating some of it, both stopped and would have no more of the poison Sudan. Then Sudan free from the poison was given them and they ate it freely. They continued to eat the long Sudan for a period of an hour and 25 minutes, while they only ate the short Sudan for 10 minutes.

It is quite evident that an animal eating Sudan sufficiently rich in prussic acid to kill, gets an intuition which causes it to stop eating, and this is one of the reasons why more deaths are not reported from cattle that pasture on Sudan grass.

Influence of Growth.

In this quest for information concerning the dangers of poisoning cattle grazing on Sudan grass, it is observed that when the grass grows to a height of 2ft. or 3ft. it is not likely to be dangerous. But it may be dangerous to graze, whether the soil is wet or dry, when less that a foot and a half in height. It would seem that the stage of development in the Sudan grass is a more important factor to consider than whether it is dry or wet.

In the investigation made by the Wisconsin Experiment Station, and research conducted by other institutions and scientists, the following facts have been discovered which are well worth recording:—

Facts Established.

Firstly, animals that are well fed are not likely to be killed when pasturing on Sudan grass even though it contains a high percentage of prussic acid. It has been observed that well-fed animals will stop eating Sudan that is high in poison before they have eaten enough to be fatal. They may show the effects of eating the poisonous grass but they will stop eating it unless too hungry.

It is sound practice never to turn hungry animals on Sudan, regardless of conditions. Death of cows which have been reported to the Wisconsin Experiment Station show that the animals were hungry when they were turned on the Sudan or had broken through a fence to reach it

Secondly, the poisonous grass was usually from 4in. to 8in. in height. The evidence indicates that when the crop reaches 2ft. to 3ft. in height, it is not dangerous to pasture.

Thirdly, it has also been found that a higher percentage of prussic acid develops in soils not properly balanced in nitrogen and phosphorus. In other words, when there is a good supply of phosphorus in the soil it is more difficult for prussic acid to form. It is thus advisable to determine the supply of phosphorus in a soil where Sudan is to be planted. If the soil is short of this element, apply phosphoric fertilizer before seeding it.

Fourthly, if a 1,000lb. animal is given one gramme of prussic acid at one dose it is fatal, but such a cow will tolerate 0.8 of a gramme of prussic acid per hour.

Fifthly, animals develop no tolerance for prussic acid—that is, if a herd is pasturing in Sudan and dry weather follows, the cows are just as susceptible to the poison as though they were turned from bluegrass pasture to Sudan.

Good Feeding Helps.

One protection against Sudan poisoning is good feeding. The Michigan Experiment Station recommends feeding 2lb. of cob-and-corn meal each day to cows pasturing on Sudan.

Sixthly, Sudan hay is safe to feed so far as prussic acid is concerned. It has been known to be fatal when fed wet, but it is now thought that bacterial or fungus growth is the agent that kills, not prussic acid. In the feeding of Sudan hay, it is well not to feed when wet, although the danger of feeding it in this condition is undoubtedly slight.

Seventhly, it was thought at one time that when the leaves of the Sudan were purple, it was more dangerous to feed than when green. It now seems that green leaves may be just as poisonous as purple leaves.

Eighthly, animals, if given the opportunity, will discriminate between Sudan which is safe and unsafe, especially if they are not too hungry.

Why a cow stops eating Sudan high in prussic acid when it begins to affect her, unless she is very hungry, is puzzling.

DeGaris Pasture Competition, 1936-37

[Comments by the Judge, Mr. R. C. Scott, Chief Agricultural Adviser.

The pasture competition inaugurated by Mr. L. A. DeGaris, of Mount Gambier, was planned to draw attention to the advantage of planting good type seed, and was conceived after a visit to New Zealand where growers exercised special care in the selection of the seed to be planted and where probably the best pastures of the world were to be found.

Mr. DeGaris imported certified seed of perennial rye grass, cocksfoot, white clover, and red clover and offered a prize of 20 guineas for the best plot established with this seed.

The competition extended over two seasons, the plots being planted in 1936 and judged both in the year of establishment and again in 1937. In the allotment of points, 75 were allowed for the 1936 judging, and 125 for the 1937; the reason for the greater number in the latter year being that the plants comprising a permanent pasture must be able to withstand the dry conditions typical of a South Australian summer. It did not always follow that the field that showed to advantage in the year of planting would necessarily develop into the best pasture stand. In this connection, the perennial plants included in pastures in this competition were favoured by the fact that the rainfall recorded in the South-East for the 1936-37 summer was much above the average.

The results indicated what could be done and encouraged others to establish similar pastures, so raising the production of the district, whilst the methods adopted by the successful men served as a guide to the operations necessary for successful planting. The points allotted to the 17 competitors are shown in the following Table:—

Competitor.	Density of Sward.		Quality of Pasture.		Freedom from Useless Weeds.		Management.		Final Results.		
Year—	1936.	1937.	1936.	1937.	1936.	1937.	1936.	1937.	1936.	1937.	Total.
Max.—	35	35	25	25	25	25	15	15	75	125	200
R. E. DeGaris, Tantanoola...	34	34	24	24	22	22	14	15	71	119	190
H. H. Osborne, Tantanoola ..	32	33	24	24	23	24	13	14	69	119	188
F. C. Caine (1), Kongorong ..	30	34	22	24	20	21	10	15	62	118	180
F. C. Caine (2), Kongorong ..	26	34	20	24	20	21	10	15	57	118	175
H. L. K. Bartlett, Mt. Schanck	26	28	22	22	18	21	11	14	58	106	164
A. B. Kidman, Glenroy......	30	28	22	22	22	18	10	13	63	101	164
Gambier Clover Est. (1) Mil-Lel	26	26	22	20	20	20	14	15	62	101	163
F. H. Kilsby, Moorak	28	29	20	20	20	20	12	13	60	103	163
D. C. Cowell, Kalangadoo....	20	30	18	22	20	21	9	15	50	110	160
R. Smith, Mt. Gambier	26	28	20	22	18	18	12	13	57	101	158
R. C. McCormick, Moorak ...	23	29	19	22	16	20	11	12	52	104	156
Gambier Clover Est. (2) Mil-Lel	18	30	20	22	12	21	11	15	46	110	156
S. A. Dow, Glencoe West ...	23	28	20	20	14	20	11	15	51	104	155
M. J. O'Neill, Moorak	28	25	18	20	20	22	8	10	56	96	152
R. C. Davis, Yahl	20	24	18	20	14	20	9	12	46	95	141
F. A. Telfer, Glencoe West ..	18	25	18	20	10	18	9	13	41	95	136
R. E. Telfer, Wepar.........	16	24	18	20	10	18	7	13	38	94	132

The main feature in connection with the above figures was the improvement in the density of the sward during the past 12 months. In practically every instance the pasture thickened up. The favourable summer weather no doubt had considerable influence in this respect, not only in promoting better pastures in the present season, but also in encouraging strong root development, and thus providing the permanent plants with means to withstand more normal conditions of summer heat and drought that were sure to occur in future years.

An improvement had also been effected in the management of the pastures. In the first year there was a tendency to overgraze and to neglect the control of bad weeds, but such was not generally the case to-day, and many of the competition fields have been correctly handled.

With permanent pastures regular grazing was very desirable, and in this connection some of the paddocks were too large. Whilst it was not possible to make a definite recommendation as to area, it was certain that fields should not exceed an area of 20 acres, and in the high-producing lands probably half this size would be more economic. In such circumstances certain fields could be shut up during the flush of the season, and the pasture allowed to develop for meadow hay or ensilage. The stock were then confined to a smaller area and the herbage maintained at the most nutritious stage for grazing animals.

Comments on the Winning Entry.—R. E. DeGaris, Snuggery, Tantanoola. Area—10 acres. Tillage—Ploughed in May; cultivated in June; twice cultivated with drill applying lime; twice harrowed: drilled in June. Seed per acre—20lbs. perennial rye grass; 4lbs. cocksfoot; 2lbs. white clover; 3lbs. red clover. Manure per acre, 1936—2cwts. superphosphate; 5cwts. carbonate of lime. 1937—2 bags superphosphate.

This was an extremely good pasture established on the black soil typical of the Millicent flats. It was of excellent density with clover predominating in some patches, but generally speaking there was a good balance of the plants seeded. The lime applied in 1936 did not appear to have had influence and no difference between the treated and untreated area could be seen. The management of the field had been good, a satisfactory quantity of superphosphate being applied each year and the pasture judiciously grazed. Only a few useless weeds were to be seen. Practically all the star thistles had been hoed out and the bad weeds kept under control. The production from this field served as an example of what could be done on the Millicent flat land, and if the methods adopted were applied generally throughout the locality a tremendous improvement in the wealth of the district would result.

Stock Inquiries

[*Replies supplied by Veterinary Officers of the Stock and Brands Department.*]

Sheep.

"MULES" OPERATION FOR FLY STRIKE.

The Secretary of the Wilmington Agricultural Bureau asks for information on the "Mules" operation for blowfly strike in sheep.

Reply: Sheep with markedly wrinkled breeches are very susceptible to "Crutch Strike." This faulty conformation can be passed down by rams and ewes having this defect, and by selection and culling can be eliminated from a flock.

It is often observed that there are folds extending on either side of the breech. Some may extend from the root of the tail downward to the crutch. The aim of the "Mules" operation is to excise them and so prevent the development of susceptibility there.

The operation is quick, cheap, and in experienced hands, simple. There is considerable evidence that the effects of the operation are permanent. Other methods of control, however, must not be neglected. The operation as done by Mr. Mules is as follows:—The sheep or lamb is sat as for tailing, and the hind wrinkles are completely removed. These wrinkles extend down on each side of the vulva. The operation is extended also to remove from about the breech any other folds which, from urine staining of the wool, show what Mr. Mules terms "brown ends," and it can also be extended further to deal with the upper parts of the above folds where they join the base of the tail.

A pair of roll-cut secateurs is used or else the fold is pinched with Burdizzo pincers and cut off with a knife which is run along inside the jaws of the instrument. Healing takes place rapidly.

The operation can be done at or about marking or after first shearing when the wool is short and a better view of the area is obtained. Older sheep could be done at a suitable time before the fly season.

Cattle.

BONE CHEWING.

"Charra" asks for a cure for cows addicted to bone chewing. Reply: The development of the craving for bones is an indication that the animals are not getting a sufficiency of mineral matter in their diet. It may also be due to a lack of proteins.

While all classes—milkers, dry cows, and young stock—may exhibit the craving, milkers are the most prone to it on account of the greater need by them for minerals and proteins to make good the loss from the body through the milk. The usual daily requirement of "concentrates"—oats, &c.—is 3lbs. to 4lbs. per gallon of milk yield.

It is more advantageous to give a "concentrate" mixture rather than only any single one foodstuff, and if it can be obtained the addition of an allowance of bran to the ration, as well as oats (which for preference should be crushed) would be beneficial.

The daily allowance of salt should be approximately 1oz. per cow, and of bonemeal, 1 to 2 heaped tablespoonsful. These can be given mixed into the damped box feed.

Horses.

FEEDING MOULDY HAY.

Secretary, Hartley Agricultural Bureau, asks, "What is the danger of feeding damaged hay to livestock?" Reply: The feeding of mouldy hay to stock is always dangerous. This is especially so in the case of horses; cattle and sheep are less susceptible to the ill effects which may follow its use. These ill effects are:—

(1) Botulism (Forage Poisoning). This disease is not caused by mouldy fodder, but the germ of this disease often grows and produces a poison (toxin) under these conditions, which favour the growth of mould.

(2) Digestive disturbances, especially in horses, often follow its use.

(3) Other conditions of a variable nature may result from feeding it to stock.

Whilst mouldy fodder is often fed to farm stock without ill effects, the stockowner should recognise that it can on occasions be dangerous. The following measures should be carried out to prevent such occurrences:—

(1) Very badly damaged fodder (*e.g.*, sheaves which are black) should be discarded.

(2) Other mouldy sheaves should be opened up and exposed to strong sunlight for 2 days.

(3) If possible, mouldy fodder after the above treatment should be fed mixed with good feed. The greater the dilution of damaged fodder the better.

Advisory Board of Agriculture

The monthly meeting of the Advisory Board of Agriculture was held on Friday, 28th January, 1938, there being present Sir Wallace Sandford (Chairman), Messrs. A. M. Dawkins, A. J. A. Koch, S. Shepherd, H. N. Wicks, F. Coleman, P. J. Baily, Dr. A. E. V. Richardson, Professor A. J. Perkins, Mr. W. J. Spafford, and the Secretary (H. C. Pritchard).

Apologies were received from Hon. A. L. McEwin (M.L.C.), Messrs. R. H. Martin, and C. A. Loxton.

The Chairman and members extended their congratulations to Dr. Richardson on his appointment as Deputy Director of the Council for Scientific and Industrial Research, and recorded their high appreciation of the services which Dr. Richardson has rendered to the Board and to the agricultural industry of South Australia.

New Branch.—Conditional approval was given to the formation of a Branch at Kilroo (Eyre's Peninsula).

Branch Closed.—The Board decided to close the Wirrilla (Women's) Branch through lack of interest.

Life Members.—The following names were added to the roll of Life Members of the Agricultural Bureau:—Messrs. A. Wells (Murray Bridge), E. S. Cooper (Bundaleer Springs), W. J. Dawkins (Gawler River).

New Members.—Approval was given to the addition of the following names to the rolls of existing Branches:—Alawoona Women's—Mrs. E. Balnaves; Arthurton—Gustave Lutze, Werne Lutze, A. G. A. Dutschke; Barmera—H. H. Johns; Beetaloo Valley—A. K. Priess; Boor's Plains—John Daddow; Cambrai—C. Helbig; Chapman's Bore—H. W. Rehn; Charra Women's—Mrs. M. Dunnet, Mrs. E. C. Brown; Coonawarra Women's—Mrs. R. R. Redman, Mrs. R. J. Childs; Cungena—Keith Bennie, W. C. Meffert; Echunga—W. G. Porteous; Georgetown Women's—Mrs. Bruggy; Green Patch—W. Hyde; Hilltown—K. Penneck, Jim Allen; Hope Forest—George Waller, Stanley A. Buchanan, Gleeson De-Caux; Inman Valley—W. R. Beresford, Ron W. Lillecrapp; Jamestown—K. McPherson; Jervois—R. A. Kelly, P. Hutchinson; Kalangadoo—D. Heysen, F. Dowdell, A. Ellison; Karte—D. Freeman; Keyneton—H. L. Kroehn, E. F. Schutz; Kingston—W. G. Smith, G. W. Ritchie, A. R. Flint, John Flint, H. Redman, L England, W. Gibson; Kybybolite—H. R. Naylor; Kybybolite Women's—Mrs. W. F. Staude; Lenswood and Forest Range—D. McIvor; Lyndoch—W. Gordon Lawes, Geo. F. Foster, H. Kies; McLaren Flat—T. C. Burgan, Dennis Elliott, W. Harris, Ian Bruce; McLaren Flat Women's—Mrs. E. Wickham, Miss J. Ward, Mrs. Fred Osborne; Milang—L. H. Moar; Mount Barker—A. Neagle, S. A. Bates, J. Walsh, C. H. Ploughman; Mount Compass—G. S. Jenkins; Mount Hope—R. R. Speed, J. R. Speed; Narrung—John McNeill, Archibald McBeath, Lester Howie, Clarence Bartlett; Palabie—John Miller, Walter Miller; Penwortham—Geo. H. Taylor, Joseph Botcher; Rendelsham Women's—Mrs. Cyril Todd; Sheoak Log Women's—Miss Isabel Carmichael; Smithville Women's—Mrs. Durdin, Miss Durdin; Spalding—J. Campbell, P. W. Donnellan; Strathalbyn—H. C. Abbott, W. R. Langsford, K. Westley, S. Sykes, W. S. Hender, Reverend Ross Dean; Belvidere—R. Perry, C. Barker, H. Pearson, W. Menadue; Ungarra—S. J. Illman; Warramboo—S. R. Fisher, Lance Chilman; Watervale—J. Ward; Wirrabara Women's—Mrs. G. A. Kranz, Mrs. K. Manning, Miss H. Hollitt; Yadnarie—W. Crispin; Kalangadoo—E. Walters; Balhannah Women's—Mrs. Chas. Beanland.

Various items submitted by branches were considered.

Tubercle Free Herd Scheme.

The following herds have been tested and comply with the conditions laid down by the Tubercle-Free Scheme, whereby stud-owners may apply to have their herds tested, free of charge, by the Stock and Brands Department:—

Owner and Address.	Cattle. No. of	Date. Expiry
1. J. H. Dawkins, Para Wirra Jersey Stud	25	16/4/38
2. W. Hawker, Anama Friesian Stud, Central Bungaree, *via* Brinkworth	37	25/11/39
3. O. H. Woodward, Marama Jersey Stud, Gilles Plains	22	2/11/38
4. G. L. Hampton, Cloverdale Illawarra Shorthorn Stud, Echunga	25	12/8/39
5. J. M. Bray, Sweethaven Jersey Stud, Langhorne's Creek	26	19/8/39
6. Kybybolite Experimental Farm, Kybybolite	88	1/9/39
7. A. Kelly, Alexandra Jersey Stud, Milang	38	21/10/39
8. Agricultural College, Roseworthy	70	9/11/39
9. E. F. Schulz, Eden Valley	30	16/12/39

Feeding Tests at Parafield Poultry Station.

A new series of feeding tests was commenced at Parafield Poultry Station on the 1st April, 1937. Five tests have been arranged each of 50 White Leghorn pullets. The principal object of these tests is to collect some accurate data concerning the results obtained from the soaked grain method of feeding in different ways, also the production of the birds under the various methods of feeding. The following is a list of the tests that have been arranged:—

A. Morning—Soaked wheat at rate of 8lbs. grain per 100 birds, meat meal ½lb. per 100 birds, greenfeed same quantity as dry grain. Afternoon—Same as morning, but meat meal ¼lb. per 100 birds.

B. Morning—Soaked wheat at rate of 8lbs. per 100 birds, ¼lb. meat meal per 100 birds, ¼lb. linseed meal per 100 birds, greenfeed same as No. 1 test. Afternoon—Same as morning, but without the ¼lb. linseed meal.

C. Morning—Soaked wheat once a day at rate of 8lbs. per 100 birds, meat meal ¾lb. per 100 birds. Afternoon—Dry wheat at rate of 1¼ozs. per bird.

D. Morning—Soaked barley twice a day at rate of 8lbs. per 100 birds, greenfeed same quantity as dry grain, meat meal ¼lb. per 100 birds. Afternoon—Greenfeed same quantity as dry grain, meat meal ¼lb. per 100 birds.

E. Morning—Soaked wheat and barley at rate of 4lbs. wheat and 4lbs. barley per 100 birds, greenfeed same bulk as dry grain, meat meal ½lb. per 100 birds, linseed meal ¼lb. per 100 birds. Afternoon—Dry grain at rate of ¾oz. wheat per bird and ¾oz. barley per bird.

The quantity of food as stated in the test will vary from time to time according to the requirements of the birds. The quantities stated in the tests are given as a basis, but are also liable to alteration according to the requirements of the stock.

Test.	No. Eggs Laid from 1st April, 1937, to 31st Dec., 1937.	No. Eggs Laid, January, 1938.	Total Eggs Laid from 1st April, 1937, to 31st Jan., 1938.
A	5,819	448	6,267
B	5,641	650	6,291
C	5,425	595	6,020
D	5,225	514	5,739
E	5,304	542	5,846

	Value of Eggs. 1st April to 31st December, 1937.			Value of Eggs. January, 1938.			Cost of Food. 1st April to 31st December, 1937.			Cost of Food. January, 1938.			Return Above Cost of Food, January, 1938.			Total Return Above Cost of Food, 1st April, 1937, to 31st Jan., 1938.		
	£	*s.*	*d.*	£	*s.*	*d.*	£	*s.*	*d.*	£	*s.*	*d.*	£	*s.*	*d.*	£	*s.*	*d.*
A	27	8	3	2	2	0	10	0	0	0	17	11	1	4	1	18	12	4
B	26	3	9	3	0	11	9	17	1	0	17	11	2	3	0	18	9	8
C	25	7	10	2	15	9	9	19	0	0	18	0	1	17	9	17	6	7
D	23	13	4	2	8	2	10	9	8	1	2	5	1	5	9	14	9	5
E	24	6	3	2	10	10	10	3	2	1	0	1	1	10	9	15	13	10

Parafield Egg-Laying Competition, 1937-38

Review of the Competition for the Month of January, 1938

[By C. F. Anderson (Chief Poultry Adviser and A. Clifton (Competition Attendant).]

The production of eggs during the month of January has been particularly good, and it was the first month in the present competition where the production was higher than for a corresponding period in the previous series. The production was 51 per cent., and this good percentage was probably accounted for by the comparatively mild weather experienced during the month.

As was usual at this time of the year, a few early moulters were beginning to show up, and to the end of January, 6 birds were moulting. This was the type of bird that any ordinary producer should immediately cull out of his flock, as it was generally an indication of lack of stamina.

Size of Egg and Effect of Feeding.

The size of egg has been particularly good during the last few months of the Competition, and for the month under review, nearly 83 per cent. of all eggs laid in the Competition were first grade. As the first grade standard was a minimum of 2ozs. in weight, the percentage was very satisfactory. It also indicated a decided influence of greenfeed at this period of the year on the size of egg. During the last few months the Competition birds have been fed an additional feed of chaffed silver beet between 2 and 3 p.m. They have been fed at the rate of 1 bucket to 200 birds. The quality of the eggs has also been particularly good. Each week all eggs laid on a particular day were candled, and the firm egg whites and brighter colour of the yolks were undoubtedly due to the additional greenfeed.

Broodiness, particularly among the heavy breeds, has again been very prevalent, and indicated that where heavy laying was aimed at with heavy breeds, particularly in a climate like South Australia, it was undoubtedly inducive to broodiness. The general health of the birds has been particularly good during the month, and there were several scores of 200 first-grade eggs and over. This was particularly so in the Home Project Section, where the leading bird of the whole competition—a Rhode Island Red—was still laying very well.

Toe-picking in Chickens.

Asked by the Keyneton branch of the Agricultural Bureau how to prevent chickens from toe-picking, Mr. C. F. Anderson (Chief Poultry Adviser) says that this trouble is frequently started by overcrowding, by lack of scratching material, by irregular feeding, or longer periods between feeding times than is advisable.

Overcrowding is particularly common with certain brooders, for although actually they may have a 100 chick capacity at a day old, they have only from 50 to 60 chick capacity at two weeks or older. With the lack of scratching material on the floor of the brooder or brooder house, instead of the feet of the chickens being more or less hidden by the scratching material—such as cocky chaff, hay chaff, or if neither is available, straw run through the cutter and chaffed up—they are on the bare floors, and when scratching for food, the chicks frequently peck the feet and so draw blood, and then there is a rush by other chickens to the unfortunate victim.

While chickens are in the hot brooders, it is always advisable to have a dry mash available in hoppers so that the chicks can feed whenever they wish; in addition, two or three feeds of cracked grain a day, and as much greenfeed as they will eat.

Fertilisers Act, 1918—Analyses of Fertilisers.

Following are results of analyses obtained by the Government Agricultural Analyst from samples procured by Inspectors of Fertilisers during the six months ended 30th June, 1937.

NOTE.—*Deficiencies greater than permitted under section 12 of the Act are shown in bold type.*

Sample No.	Name of Firm and Fertiliser.	Phosphate.								Nitrogen.		Nitrogen as Nitrates.	
		Water Soluble.		Citrate Soluble.		Acid Soluble.		Total.					
		Vendor's Guarantee.	Result of Analysis.	Vendor's Guarantee.	Result of Analysis.	Vendor's Guarantee.	Result of Analysis.	Vendor's Guarantee.	Result of Analysis.	Vendor's Guarantee.	Result of Analysis.	Vendor's Guarantee.	Result of Analysis.
		%	%	%	%	%	%	%	%	%	%	%	%
	Adelaide Chemical and Fertilizer Co., Ltd.—												
2076	**Blood Manure**	—	—	—	—	—	—	—	—	13·0	13·8	—	—
2077	**Imperial Blood Manure**	—	—	—	—	—	—	—	—	11·75	12·7	—	—
3233	Bone Dust	—	—	—	—	40·0	45·1	40·0	45·1	3·5	4·0	—	—
2061	Bone Dust	—	—	—	—	40·0	43·5	40·0	43·5	3·5	3·7	—	—
2081	Bone Dust	—	—	—	—	40·0	44·8	40·0	44·8	3·5	4·3	—	—
3240	Blood and Bone Special	—	—	—	—	38·0	44·5	38·0	44·5	5·3	5·4	—	—
3234	Bone and Super	21·0	22·1	10·0	13·7	12·0	15·9	43·0	51·7	1·6	1·8	—	—
3247	No. 1 Complete Manure	20·0	22·5	8·0	9·7	4·0	5·4	32·0	37·9	1·5	1·5	—	—
2075	Complete Manure 2-2-1	18·0	17·9	1·0	1·1	1·0	2·1	20·0	21·1	8·24	8·5	—	—
3246	Nitrate of Soda	—	—	—	—	—	—	—	—	—	—	16·0	16·0
3236	P.N.P. Mixture	28·0	28·8	1·0	2·7	2·0	3·7	31·0	35·2	1·5	1·6	—	—
3235	45 Super	45·0	43·2	—	—	—	—	45·0	43·2	—	—	—	—
3241	45 Super	45·0	45·4	—	—	—	—	45·0	45·4	—	—	—	—
2073	45 Super	45·0	45·1	—	—	—	—	45·0	45·1	—	—	—	—
2080	Sulphate of Ammonia (Neutral)	—	—	—	—	—	—	—	—	20·6	21·0	—	—
3244	Sulphate of Potash	—	—	—	—	—	—	—	—	—	—	—	—
2079	**Special Lawn Manure**	7·0	9·7	7·0	8·9	8·0	8·2	22·0	26·8	6·0	6·2	—	—
2074	**2 : 1 Super and Ammonia No. 3**	30·0	30·4	1·0	0·6	1·0	3·9	32·0	34·9	6·87	7·3	—	—
	Cresco Fertilizers, Ltd.—												
2062	**Bone Dust**	—	—	—	—	40·0	40·3	40·0	40·3	3·5	3·7	—	—
3229	**50/50 Phosphate**	20·0	21·4	4·0	2·5	38·0	43·6	62·0	67·5	—	—	—	—
3230	**45 Super**	45·0	44·6	—	—	—	—	45·0	44·6	—	—	—	—
3242	**45 Super**	45·0	46·1	—	—	—	—	45·0	46·1	—	—	—	—
2054	**45 Super**	45·0	46·3	—	—	—	—	45·0	46·3	—	—	—	—
2063	**45 Super**	45·0	46·4	—	—	—	—	45·0	46·4	—	—	—	—
3250	**48 Super**	48·0	49·0	—	—	—	—	48·0	49·0	—	—	—	—
3228	**6 : 1 Super and Ammonia No. 1**	38·0	39·5	1·0	5·2	2·0	2·3	41·0	47·0	2·95	3·0	—	—
	J. A. Heddle—												
3238	**Bone Manure**	—	—	—	—	28·0	32·7	28·0	32·7	4·0	4·0	—	—
	W. Jacobs, Ltd.												
3237	**Bone Manure**	—	—	—	—	29·0	39·7	29·0	39·7	4·0	4·8	—	—
	E. A. J. James—												
2056	**Carbo-Lime**	—	—	—	—	—	—	—	—	—	—	—	—
	Kill-a-mite Co.—												
3412	**Kill-a-mite**	—	—	—	—	9·5	10·0	9·5	10·0	2·0	2·1	—	—
	Lawford's Fruit Exchange, Pty., Ltd.—												
3243	**L.F.X. Castor Meal Fertilizer**	—	—	—	4·1	4·91	0·2	4·91	4·3	4·5	4·9	—	—

Analyses of Fertilisers—*continued.*

Sample No.	Name of Firm and Fertiliser.	Potash in Water Soluble Form.		Calcium Oxide, CaO.		Calcium Oxide Expressed as Calcium Sulphate, CaSO4.		Bone Manure, Fine Material.		Agricultural Lime, Fine Material.		Gypsum, Fine Material.		Phosphate Fertiliser, Fine Material.		Moisture.
		Vendor's Guarantee.	Result of Analysis.	Vendor's Guarantee.	Result of Analysis.	Vendor's Guarantee.	Result of Analysis.	Vendor's Guarantee.	Result of Analysis.	Vendor's Guarantee.	Result of Analysis.	Vendor's Guarantee.	Result of Analysis.	Vendor's Guarantee.	Result of Analysis.	
		%	%	%	%	%	%	%	%	%	%	%	%	%	%	%
	Adelaide Chemical and Fertilizer Co., Ltd.—															
2076	Blood Manure	—	—	—	—	—	—	—	—	—	—	—	—	—	—	8·3
2077	Imperial Blood Manure	—	—	—	—	—	—	—	—	—	—	—	—	—	—	11·9
3233	Bone Dust	—	—	—	—	—	—	50·0	55·8	—	—	—	—	—	—	4·9
2061	Bone Dust	—	—	—	—	—	—	50·0	55·7	—	—	—	—	—	—	5·1
2081	Bone Dust	—	—	—	—	—	—	50·0	50·0	—	—	—	—	—	—	5·4
3240	Blood and Bone Special	—	—	—	—	—	—	50·0	63·0	—	—	—	—	—	—	5·9
3234	Bone and Super	—	—	—	—	—	—	—	—	—	—	—	—	60·0	70·2	4·9
3247	No. 1 Complete Manure	4·5	4·7	—	—	—	—	—	—	—	—	—	—	—	—	3·25
2075	Complete Manure 2-2-1	9·7	10·1	—	—	—	—	—	—	—	—	—	—	—	—	2·8
3246	Nitrate of Soda	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0·26
3236	P.N.P. Mixture	7·5	8·1	—	—	—	—	—	—	—	—	—	—	—	—	5·1
3235	45 Super	—	—	—	—	—	—	—	—	—	—	—	—	—	—	8·3
3241	45 Super	—	—	—	—	—	—	—	—	—	—	—	—	—	—	3·75
2073	45 Super	—	—	—	—	—	—	—	—	—	—	—	—	—	—	7·2
2080	Sulphate of Ammonia (Neutral)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0·24
3244	Sulphate of Potash	48 6	50 8	—	—	—	—	—	—	—	—	—	—	—	—	0·3
2079	Special Lawn Manure	—	—	—	—	—	—	—	—	—	—	—	—	—	—	3·5
2074	2 : 1 Super and Ammonia No. 3	—	—	—	—	—	—	—	—	—	—	—	—	—	—	2·7
	Cresco Fertilizers, Ltd.—															
2062	Bone Dust	—	—	—	—	—	—	50 0	62·5	—	—	—	—	—	—	4·8
3229	50/50 Phosphate	—	—	—	—	—	—	—	—	—	—	—	—	95·0	99·1	3·1
3230	45 Super	—	—	—	—	—	—	—	—	—	—	—	—	—	—	6·5
3242	45 Super	—	—	—	—	—	—	—	—	—	—	—	—	—	—	3·9
2054	45 Super	—	—	—	—	—	—	—	—	—	—	—	—	—	—	8·3
2063	45 Super	—	—	—	—	—	—	—	—	—	—	—	—	—	—	7·7
3250	48 Super	—	—	—	—	—	—	—	—	—	—	—	—	—	—	7·6
3228	6 : 1 Super and Ammonia No. 1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	4·6
	J. A. Heddle—															
3238	Bone Manure	—	—	—	—	—	—	65·0	68·8	—	—	—	—	—	—	5·2
	W. Jacobs, Ltd.—															
3237	Bone Manure	—	—	—	—	—	—	75·0	78·0	—	—	—	—	—	—	6·5
	E. A. J. James—															
2056	Carbo-Lime	—	—	47·0	48·1	—	—	—	—	90·0	99·5	—	—	—	—	0·6
	Kill-a-mite Co.—															
3412	Kill-a-mite	2·0	2 7	—	—	—	—	—	—	—	—	—	—	—	—	—
	Lawford's Fruit Exchange, Pty., Ltd.—															
3243	L.F.X. Castor Meal Fertilizer	—	0·77	—	—	—	—	—	—	—	—	—	—	54·0	—	7·3

ANALYSES OF FERTILISERS—*continued.*

Sample No.	Name of Firm and Fertiliser.	Phosphate.								Nitrogen.		Nitrogen as Nitrates.	
		Water Soluble.		Citrate Soluble.		Acid Soluble.		Total.					
		Vendor's Guarantee.	Result of Analysis.	Vendor's Guarantee.	Result of Analysis.	Vendor's Guarantee.	Result of Analysis.	Vendor's Guarantee.	Result of Analysis.	Vendor's Guarantee.	Result of Analysis.	Vendor's Guarantee.	Result of Analysis.
		%	%	%	%	%	%	%	%	%	%	%	%
	Metropolitan and Export Abattoirs Board—												
3221	Blood Manure	—	—	—	—	—	—	—	—	13·0	13·3	—	—
3223	Blood Manure	—	—	—	—	—	—	—	—	13·0	13·6	—	—
2059	Blood Manure	—	—	—	—	—	—	—	—	13·0	13·5	—	—
2065	Blood Manure	—	—	—	—	—	—	—	—	13·0	13·1	—	—
2066	Bone Dust	—	—	—	—	45·0	56·0	45·0	56·0	4·5	8·9	—	—
3219	No. 1 Bone Manure	—	—	—	—	25·0	24·3	25·0	24·3	7·5	7·9	—	—
2057	No. 1 Bone Manure	—	—	—	—	25·0	30·6	25·0	30·6	7·5	7·2	—	—
3220	No. 2 Bone Manure	—	—	—	—	25·0	38·7	25·0	38·7	4·5	5·7	—	—
3222	No. 2 Bone Manure	—	—	—	—	25·0	30·3	25·0	30·3	4·5	6·3	—	—
2058	No. 2 Bone Manure	—	—	—	—	25·0	42·9	25·0	42·9	4·5	5·2	—	—
2060	No. 2 Bone Manure	—	—	—	—	25·0	29·4	25·0	29·4	4·5	6·3	—	—
3224	Port Bone Manure	—	—	—	—	25·0	31·1	25·0	31·1	6·0	7·0	—	—
2064	Port Bone Manure	—	—	—	—	25·0	33·9	25·0	33·9	6·0	6·5	—	—
	S. R. Trenwith—												
2055	Calcium Hydroxide and Carbonate of Lime	—	—	—	—	—	—	—	—	—	—	—	—
	Wallaroo-Mount Lyell Fertilisers, Ltd.												
2071	Guano Super	27·0	26·0	3·0	5·3	3·0	3·8	33·0	35·1	—	—	—	—
3232	45 Super	45·0	47·8	—	—	—	—	45·0	47·8	—	—	—	—
3249	45 Super	45·0	47·4	—	—	—	—	45·0	47·4	—	—	—	—
2069	45 Super	45·0	44·8	—	—	—	—	45·0	44·8	—	—	—	—
3231	45 Super (Granular)	45·0	43·7	—	—	—	—	45·0	43·7	—	—	—	—
2067	45 Super (Granular)	45·0	46·9	—	—	—	—	45·0	46·9	—	—	—	—
3248	48 Super	48·0	47·9	—	—	—	—	48·0	47·9	—	—	—	—
2068	48 Super	48·0	49·9	—	—	—	—	48·0	49·9	—	—	—	—
2070	Sulphate of Ammonia (Neutral)	—	—	—	—	—	—	—	—	20·6	20·9	—	—
3239	Special Lawn Manure	7·0	8·7	7·0	7·8	8·0	6·9	22·0	23·4	6·0	6·45	—	—
3245	1 : 1 Special Mixture	22·0	22·4	1·0	0·9	1·0	0·3	24·0	23·6	10·3	11·3	—	—
	Wingfield Casing Co., Pty., Ltd.—												
3225	Blood Manure	—	—	—	—	—	—	—	—	11·0	12·2	—	—
3226	Blood Manure	—	—	—	—	—	—	—	—	12·0	14·0	—	—
2072	Blood Manure	—	—	—	—	—	—	—	—	11·0	11·8	—	—
3227	Ground Oyster Shell	—	—	—	—	—	—	—	—	—	—	—	—
	The Phosphate Co-op. Co. of Australia, Ltd.—												
2505	"Pivot" Super	45·0	46·5	1·0	3·2	2·0	3·1	48·0	52·8	—	—	—	—

ANALYSES OF FERTILISERS—*continued.*

Sample No.	Name of Firm and Fertiliser.	Potash in Water Soluble Form.		Calcium Oxide, CaO.		Calcium Oxide Expressed as Calcium Sulphate. CaSO4.		Bone Manure, Fine Material.		Agricultural Lime, Fine Material.		Gypsum, Fine Material.		Phosphate Fertiliser, Fine Material.		Moisture.
		Vendor's Guarantee.	Result of Analysis.	Vendor's Guarantee.	Result of Analysis.	Vendor's Guarantee.	Result of Analysis.	Vendor's Guarantee.	Result of Analysis.	Vendor's Guarantee.	Result of Analysis.	Vendor's Guarantee.	Result of Analysis.	Vendor's Guarantee.	Result of Analysis.	
		%	%	%	%	%	%	%	%	%	%	%	%	%	%	%
	Metropolitan and Export Abattoirs Board—															
3221	Blood Manure	—	—	—	—	—	—	—	—	—	—	—	—	—	—	8·5
3223	Blood Manure	—	—	—	—	—	—	—	—	—	—	—	—	—	—	8·6
2059	Blood Manure	—	—	—	—	—	—	—	—	—	—	—	—	—	—	8·3
2065	Blood Manure	—	—	—	—	—	—	—	—	—	—	—	—	—	—	8·8
2066	Bone Dust	—	—	—	—	—	—	80·0	80·0	—	—	—	—	—	—	2·8
3219	No. 1 Bone Manure	—	—	—	—	—	—	50·0	49·4	—	—	—	—	—	—	7·5
2057	No. 1 Bone Manure	—	—	—	—	—	—	50·0	58·5	—	—	—	—	—	—	7·0
3220	No. 2 Bone Manure	—	—	—	—	—	—	55·0	76·9	—	—	—	—	—	—	5·5
3222	No. 2 Bone Manure	—	—	—	—	—	—	55·0	75·8	—	—	—	—	—	—	4·6
2058	No. 2 Bone Manure	—	—	—	—	—	—	55·0	78·0	—	—	—	—	—	—	5·8
2060	No. 2 Bone Manure	—	—	—	—	—	—	55·0	64·0	—	—	—	—	—	—	5·8
3224	Port Bone Manure	—	—	—	—	—	—	60·0	70·0	—	—	—	—	—	—	4·4
2064	Port Bone Manure	—	—	—	—	—	—	60·0	79·7	—	—	—	—	—	—	5·0
	S. R. Trenwith—															
2055	Calcium Hydroxide and Carbonate of Lime	—	—	20·0	34·9	—	—	—	—	80·0	88·0	—	—	—	—	6·1
	Wallaroo-Mount Lyell Fertilisers, Ltd.—															
2071	Guano Super	—	—	—	—	—	—	—	—	—	—	—	—	—	—	4·4
3232	45 Super	—	—	—	—	—	—	—	—	—	—	—	—	—	—	8·7
3249	45 Super	—	—	—	—	—	—	—	—	—	—	—	—	—	—	6·7
2069	45 Super	—	—	—	—	—	—	—	—	—	—	—	—	—	—	7·1
3231	45 Super (Granular)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	10·0
2067	45 Super (Granular)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	10·1
3248	48 Super	—	—	—	—	—	—	—	—	—	—	—	—	—	—	7·1
2068	48 Super	—	—	—	—	—	—	—	—	—	—	—	—	—	—	8·6
2070	Sulphate of Ammonia (Neutral)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0·2
3239	Special Lawn Manure	—	—	—	—	—	—	—	—	—	—	—	—	—	—	1·6
3245	1 : 1 Special Mixture	—	—	—	—	—	—	—	—	—	—	—	—	—	—	1·8
	Wingfield Casing Co., Pty., Ltd.—															
3225	Blood Manure	—	—	—	—	—	—	—	—	—	—	—	—	—	—	9·5
3226	Blood Manure	—	—	—	—	—	—	—	—	—	—	—	—	—	—	6·8
2072	Blood Manure	—	—	—	—	—	—	—	—	—	—	—	—	—	—	10·2
3227	Ground Oyster Shell	—	—	35·0	46·8	—	—	—	—	35·0	38·5	—	—	—	—	3·9
	The Phosphate Co-op. Co. of Australia, Ltd.—															
2505	" Pivot " Super	—	—	—	—	—	—	—	—	—	—	—	—	—	—	8·8

Following are results of analyses obtained by the Government Agricultural Analyst from samples procured by Inspectors of Fertilisers during the six months ended 30th December, 1937.

NOTE.—*Deficiencies greater than permitted under section 12 of the Act are shown in bold type.*

Sample No.	Name of Firm and Fertiliser.	Phosphate.								Nitrogen.		Nitrogen as Nitrates.	
		Water Soluble.		Citrate Soluble.		Acid Soluble.		Total.					
		Vendor's Guarantee.	Result of Analysis.	Vendor's Guarantee.	Result of Analysis.	Vendor's Guarantee.	Result of Analysis.	Vendor's Guarantee.	Result of Analysis.	Vendor's Guarantee.	Result of Analysis.	Vendor's Guarantee.	Result of Analysis.
		%	%	%	%	%	%	%	%	%	%	%	%
	Adelaide Chemical and Fertilizer Co., Ltd.—												
3512	Blood and Bone "M"	—	—	—	—	27·0	28·5	27·0	28·5	7·5	7·7	—	—
3513	Blood and Bone Special	—	—	—	—	38·0	43·4	38·0	43·4	5·3	5·4	—	—
3521	Bone Dust	—	—	—	—	40·0	42·2	40·0	42·2	3·5	3·9	—	—
2099	Bone and Super	21·0	23·0	10 0	11·8	12·0	14·4	43·0	49·2	1·6	2·0	—	—
2098	1 : 1 Mixture	22·0	23·5	1·0	1·4	1·0	2·9	24·0	27·8	10·3	10·5	—	—
3530	Muriate of Potash	—	—	—	—	—	—	—	—	—	—	—	—
2100	Sulphate of Ammonia (Neutral)	—	—	—	—	—	—	—	—	20·6	21·0	—	—
3528	6 : 1 Super and Ammonia No. 1	38·0	40·2	1·0	1·5	2·0	4·9	41·0	46·6	2·95	2·68	—	—
2097	3 : 1 Super and Ammonia No. 2	34·0	34·5	1·0	1·7	1·0	4·2	36·0	40·4	5·15	5·80	—	—
3529	2 : 1 Super and Ammonia No. 3	30·0	33·5	1·0	1·1	1·0	3·0	32·0	37·6	6·87	7·32	—	—
3514	Special Mixture No. 78	14·0	13·1	0·5	11·6	21·0	17·4	35·5	42·1	2·5	3·2	—	—
	Cresco Fertilizers, Ltd.—												
2086	Bone Dust	—	—	—	—	40·0	42·5	40·0	42·5	3·5	3·2	—	—
3523	Bone Dust	—	—	—	—	40·0	44·0	40·0	44·0	3·5	3·7	—	—
2084	No. 1 Bone Manure	—	—	—	—	25·0	29·5	25·0	29·5	7·5	7·2	—	—
2085	45 Super	45·0	45·9	—	—	—	—	45·0	45·9	—	—	—	—
3524	45 Super	45·0	46·5	—	—	—	—	45·0	46·5	—	—	—	—
	J. A. Heddle—												
3501	Bone Manure	—	—	—	—	28·0	34·2	28·0	34·2	4·0	4·1	—	—
	H. W. Hoffmann—												
2083	Para Bone Manure	—	—	—	—	40·0	44·3	40·0	44·3	3·5	3·3	—	—
	W. Jacobs, Ltd.—												
3515	Bone Manure	—	—	—	—	29·0	36·8	29·0	36·8	4·0	5·0	—	—
	E. A. J. James—												
3522	Carbo-Lime	—	—	—	—	—	—	—	—	—	—	—	—
	Metropolitan and Export Abattoirs Board—												
3508	Blood Manure	—	—	—	—	—	—	—	—	13·0	13·5	—	—
3520	Blood Manure	—	—	—	—	—	—	—	—	13·0	14·2	—	—
3506	No. 1 Bone Manure	—	—	—	—	25·0	30·9	25·0	30·9	7·5	7·6	—	—
3519	No. 1 Bone Manure	—	—	—	—	25·0	25·0	25·0	25·0	7·5	7·7	—	—
3507	No. 2 Bone Manure	—	—	—	—	25·0	44·9	25·0	44·9	4·5	5·1	—	—
3509	No. 2 Bone Manure	—	—	—	—	25·0	28·5	25·0	28·5	4·5	6·4	—	—
2096	Port Bone Manure	—	—	—	—	25·0	36·5	25·0	36·5	6·0	5·6	—	—
	Shell Fertilizers, Ltd.—												
2090	Ground Oyster Shell	—	—	—	—	—	—	—	—	—	—	—	—
	Silbert Sharp & Bishop, Ltd.—												
3511	Crespin Blood Manure	—	—	—	—	—	—	—	—	12·0	13·5	—	—

ANALYSES OF FERTILISERS—*continued*

Sample No.	Name of Firm and Fertiliser	Potash in Water Soluble Form		Calcium Oxide, CaO		Calcium Oxide Expressed as Calcium Sulphate, CaSO4		Bone Manure, Fine Material		Agricultural Lime, Fine Material		Gypsum Fine Material		Phosphate Fertiliser, Fine Material.		Moisture.
		Vendor's Guarantee	Result of Analysis	Vendor's Guarantee	Result of Analysis	Vendor's Guarantee	Result of Analysis	Vendor's Guarantee	Result of Analysis	Vendor's Guarantee.	Result of Analysis.	Vendor's Guarantee	Result of Analysis	Vendor's Guarantee.	Result of Analysis.	
		%	%	%	%	%	%	%	%	%	%	%	%	%	%	
	Adelaide Chemical and Fertilizer Co. Ltd.—															
3512	Blood and Bone "M"	—			—	—	—	95·0	95·0	—	—	—	—	—	—	5·8
3513	Blood and Bone Special			—	—		—	50·0	50·4	—	—	—	—	—	—	6·9
3521	Bone Dust	—					—	50·0	49·3	—	—	—	—	—	—	8·5
2099	Bone and Super		—		—	—	—	—	—	—	—	—	—	60·0	67·0	9·5
2098	1 1 Mixture	—	—	—	—	—	—	—	—	—	—	—	—	—	—	2·2
3530	Muriate of Potash	50·0	52·1	—	—	—	—	—	—	—	—	—	—	—	—	0·5
2100	Sulphate of Ammonia (Neutral)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0·2
3528	6 1 Super and Ammonia No. 1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	7·4
2097	3 1 Super and Ammonia No. 2	—	—	—	—	—	—	—	—	—	—	—	—	—	—	3·8
3529	2 1 Super and Ammonia No. 3	—		—	—	—	—	—	—	—	—	—	—	—	—	1·8
3514	Special Mixture No. 78	3·75	2·86	—	—	—	—	—	—	—	—	—	—	—	—	5·3
	Cresco Fertilizers Ltd.—															
2086	Bone Dust	—	—	—	—	—	—	50·0	58·0	—	—	—	—	—	—	6·4
3523	Bone Dust		—	—	—	—	—	50·0	56·5	—	—	—	—	—	—	4·6
2084	No. 1 Bone Manure			—	—	—	—	50·0	63·0	—	—	—	—	—	—	6·8
2085	45 Super				—	—	—	—	—	—	—	—	—	—	—	7·4
3524	45 Super		—		—	—	—	—	—	—	—	—	—	—	—	6·0
	J. A. Heddle—															
3501	Bone Manure	—	—	—	—	—		65·0	65·0	—	—	—	—	—	—	7·0
	H. W. Hoffmann															
2083	Para Bone Manure	—		—	—	—	—	45·0	100·0	—	—	—	—	—	—	7·0
	W. Jacobs Ltd.—															
3515	Bone Manure	—		—	—	—	—	75·0	76·2	—	—	—	—	—	—	9·4
	E. A. J. James—															
3522	Carbo Lime	—		47·0	47·8	—	—	—	—	90·0	99·9	—	—	—	—	3·5
	Metropolitan and Export Abattoirs Board															
3508	Blood Manure				—	—	—	—	—	—	—	—	—	—	—	9·7
3520	Blood Manure	—	—	—	—		—	—	—	—	—	—	—	—	—	6·0
3506	No. 1 Bone Manure	—	—	—	—	—	—	50·0	53·0	—	—	—	—	—	—	5·8
3519	No. 1 Bone Manure		—		—	—	—	50·0	50·5	—	—	—	—	—	—	8·7
3507	No. 2 Bone Manure					—	—	55·0	52·0	—	—	—	—	—	—	7·1
3509	No. 2 Bone Manure	—	—	—	—	—	—	55·0	63·0	—	—	—	—	—	—	7·4
2096	Port Bone Manure	—	—			—		60·0	79·0	—	—	—	—	—	—	4·6
	Shell Fertilizers Ltd.—															
2090	Ground Oyster Shell		—	30·0	35·7	—	—	—	—	80·0	89·0	—	—	—	—	1·0
	Silbert Sharp and Bishop Ltd.—															
3511	Crespin Blood Manure	—		—	—	—	—	—	—	—	—	—	—	—	—	10·0

ANALYSES OF FERTILISERS—*continued.*

Sample No.	Name of Firm and Fertiliser.	Phosphate.								Nitrogen.		Nitrogen as Nitrates.	
		Water Soluble.		Citrate Soluble.		Acid Soluble.		Total.					
		Vendor's Guarantee.	Result of Analysis.	Vendor's Guarantee.	Result of Analysis.	Vendor's Guarantee.	Result of Analysis.	Vendor's Guarantee.	Result of Analysis.	Vendor's Guarantee.	Result of Analysis.	Vendor's Guarantee.	Result of Analysis.
		%	%	%	%	%	%	%	%	%	%	%	%
	S. R. Trenwith—												
3518	Calcium Hydroxide and Carbonate of Lime	—	—	—	—	—	—	—	—	—	—	—	—
	A. J. Webb—												
3534	Carbonate of Lime	—	—	—	—	—	—	—	—	—	—	—	—
	Wingfield Casing Co., Pty., Ltd.—												
2089	Blood Manure	—	—	—	—	—	—	—	—	11·0	11·8	—	—
3527	Bone Manure	—	—	—	—	37·0	53·4	37·0	53·4	3·0	2·75	—	—
	Wallaroo-Mount Lyell Fertilisers, Ltd.—												
2093	Bone Dust	—	—	—	—	40·0	42·8	40·0	42·8	3·5	3·5	—	—
3516	Bone and Super	21·0	21·8	10·0	10·9	12·0	14·4	43·0	47·1	1·6	2·1	—	—
2094	Guano Super	27·0	27·6	3·0	4·1	3·0	3·4	33·0	35·1	—	—	—	—
2095	Sulphate of Ammonia (Neutral)	—	—	—	—	—	—	—	—	20·6	20·9	—	—
3525	Sulphate of Ammonia (Neutral)	—	—	—	—	—	—	—	—	20·6	20·9	—	—
2092	45 Super	45·0	46·1	—	—	—	—	45·0	46·1	—	—	—	—
3526	45 Super	45·0	46·7	—	—	—	—	45·0	46·7	—	—	—	—
	Wooltana Fertilizers—												
2082	Wooltana "A"	6·0	4·0	10·0	8·5	22·0	25·6	38·0	38·1	2·5	1·9	—	—
2088	Wooltana "B2"	5·0	5·2	9·0	6·0	20·0	21·4	34·0	32·6	6·0	5·1	—	—
3502	Wooltana "A1"	7·5	7·1	4·0	6·2	25·0	29·7	36·5	43·0	2·0	1·4	—	—
3503	Wooltana "G"	7·0	8·5	3·0	4·4	25·0	25·0	35·0	37·9	1·5	1·35	—	—
3504	Wooltana "F"	7·5	7·7	4·0	4·8	28·0	28·5	39·5	41·0	5·0	5·1	—	—
3505	Wooltana "A1"	7·0	5·1	4·0	4·4	25·0	21·5	36·0	31·0	1·5	1·7	—	—
	1J												
3510	Wooltana "A2"	7·0	5·9	4·0	5·9	28·0	36·0	39·0	47·8	2·5	1·9	—	—

ANALYSES OF FERTILISERS—*continued.*

Sample No.	Name of Firm and Fertiliser.	Potash in Water Soluble Form.		Calcium Oxide, CaO.		Calcium Oxide Expressed as Calcium Sulphate, CaSO4.		Bone Manure, Fine Material.		Agricultural Lime, Fine Material.		Gypsum, Fine Material.		Phosphate Fertiliser, Fine Material.		Moisture.
		Vendor's Guarantee.	Result of Analysis.	Vendor's Guarantee.	Result of Analysis.	Vendor's Guarantee.	Result of Analysis.	Vendor's Guarantee.	Result of Analysis.	Vendor's Guarantee.	Result of Analysis.	Vendor's Guarantee.	Result of Analysis.	Vendor's Guarantee.	Result of Analysis.	
		%	%	%	%	%	%	%	%	%	%	%	%	%	%	%
	S. R. Trenwith—															
3518	Calcium Hydroxide and Carbonate of Lime	—	—	20·0	40·5	—	—	—	—	80·0	80·0	—	—	—	—	3·5
	A. J. Webb—															
3534	Carbonate of Lime	—	—	47·3	50·7	—	—	—	—	92·0	82·4	—	—	—	—	0·7
	Wingfield Casing Co., Pty., Ltd.—															
2089	Blood Manure	—	—	—	—	—	—	—	—	—	—	—	—	—	—	10·6
3527	Bone Manure	—	—	—	—	—	—	50·0	50·4	—	—	—	—	—	—	4·6
	Wallaroo-Mount Lyell Fertilisers, Ltd.—															
2093	Bone Dust	—	—	—	—	—	—	50·0	57·0	—	—	—	—	—	—	6·4
3516	Bone and Super	—	—	—	—	—	—	—	—	—	—	—	—	60·0	83·8	4·9
2094	Guano Super	—	—	—	—	—	—	—	—	—	—	—	—	—	—	5·3
2095	Sulphate of Ammonia (Neutral)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0·22
3525	Sulphate of Ammonia (Neutral)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0·1
2092	45 Super	—	—	—	—	—	—	—	—	—	—	—	—	—	—	10·7
3526	45 Super	—	—	—	—	—	—	—	—	—	—	—	—	—	—	6·7
	Wooltana Fertilizers—															
2082	Wooltana "A"	0·33	0·24	—	—	—	—	—	—	—	—	—	—	55·0	86·9	9·8
2088	Wooltana "B2"	0·33	0·4	—	—	—	—	—	—	—	—	—	—	55·0	84·0	8·4
3502	Wooltana "A1"	0·25	0·28	—	—	—	—	—	—	—	—	—	—	55·0	75·0	11·0
3503	Wooltana "G"	10·0	10·9	—	—	—	—	—	—	—	—	—	—	55·0	82·0	6·5
3504	Wooltana "F"	—	—	—	—	—	—	—	—	—	—	—	—	55·0	81·0	7·1
3505	Wooltana "A1"	6·0	9·4	—	—	—	—	—	—	—	—	—	—	55·0	81·0	8·6
	1J															
3510	Wooltana "A2"	0·25	0·27	—	—	—	—	—	—	—	—	—	—	55·0	68·0	14·0

Dairy Farm Competitions, 1936-37

[ADELAIDE HILLS DISTRICT.]

[Judged by H. B. BARLOW, Chief Dairy Instructor.]

The following awards were made in the Dairy Herd and Farm Management Sections of the competitions conducted by the South Australian Committee of the Australian Dairy Board.

FARM MANAGEMENT.

Position.	Competitor.	Lay-out, etc. 40	Sanitation, etc. 40	Records. 20	Total. 100
1	Peters, H. B., Mt. Compass	35	35	20	90
1	Farr, E. A., Meadows	36	36	18	90
3	Walsh, H. R., Mt. Barker	36	30	20	86
4	Buckley, S. R., Charleston	30	30	17	77
5	Dunne J. P., Mt. Barker	28	36	10	74

DAIRY HERD.

Position.	Competitor.	Breed and Dairy Type. 80	Condition, etc. 30	Sire Pure-Bred. 25	Ex Tested Dam. 15	Total. 150
1	Peters, H. B., Mt. Compass	72	28½	21½	13	135
2	Walsh, H. R., Mt Barker	72	28½	21	9	130½
3	Farr, E. A., Meadows	68	27	21	13½	129½
4	Dunne, J. P., Mt. Barker	64	24	20	12	120
5	Buckley, S. R., Charleston	60	25	18	—	103

PASTURE COMPETITION.

[ADELAIDE HILLS DISTRICT.]

[Judged by R. HILL, District Agricultural Adviser.]

Position.	Competitor.	Address.	Density and Evenness of Sward. 50	Botanical Composition. 40	Absence of Undesirable Weeds. 25	Management. 75	Area Presented for Competition. 10	Total. 200
1	Peters, H. B.	Mt. Compass ..	48	36	21	65	1	171
2	Farr, E. A.	Meadows	42	33	21	66	8	170
3	Irwin, J. M.	Mt. Barker ...	42	35	23	68	1	169
4	Laing, R. J.	Gumeracha ...	40	32	23	65	4	164
5	Buckley, S. R.	Charleston	40	30	20	66	5	161
6	Sickerdick, A. A.	Lobethal	42	32	22	60	4	160
6	Jackman, J. Rex.....	Paris Creek....	40	30	22	66	2	160

[SOUTH-EAST DISTRICT.]

[Judged by E. S. ALCOCK, District Agricultural Adviser.]

Position.	Name.	Density and Evenness. 50	Composition of Pasture. 50	Freedom from Useless Plants. 25	Subdivision of Area. 25	Utilization of Pasture. 50	Total. 200
1	Caine, F. C., Kongorong ..	44	45	21	23	43	176
2	Wookey, R. J., Robe	42	43	25	23	42	175
2	Wray, J. M., Hynam......	43	42	23	23	44	175
4	Allen, A. H., Wandilo	38	40	23	23	44	168
5	Moritz, H., Kalangadoo ..	39	39	22	22	43	165

Rainfall Table

The following figures, from data supplied by the Commonwealth Meteorological Department, show the rainfall of the subjoined stations for the month of January, 1938; also the average precipitation for January, and the average annual rainfall.

Station.	For Jan., 1938.	Av'ge. for Jan.	Av'ge. Annual Rainfall.
FAR NORTH AND UPPER NORTH.			
Oodnadatta	0·10	0·55	4·60
Marree	—	0·40	5·78
Farina	0·04	0·49	6·30
Copley	0·13	0·53	7·72
Beltana	0·17	0·64	8·34
Blinman	0·41	0·88	11·64
Hookina	0·81	0·50	10·85
Hawker	0·98	0·56	12·04
Wilson	1·10	0·60	11·63
Gordon	1·13	0·57	10·25
Quorn	0·83	0·62	13·02
Port Augusta	0·51	0·54	9·38
Bruce	0·65	0·51	9·78
Hammond	0·55	0·60	11·02
Wilmington	0·43	0·80	17·17
Willowie	0·09	0·47	12·07
Melrose	0·75	1·14	22·79
Booleroo Centre	0·64	0·75	15·08
Port Germein	0·37	0·64	12·49
Wirrabara	1·18	0·70	19·13
Appila	0·90	0·64	14·55
Cradock	1·38	0·57	10·62
Carrieton	2·66	0·72	12·06
Johnburg	1·47	0·57	10·47
Eurelia	1·27	0·74	12·61
Orroroo	3·07	0·93	13·10
Nackara	0·93	0·66	11·09
Black Rock	1·69	0·67	12·24
Oodlawirra	1·58	0·64	11·37
Peterborough	1·29	0·79	13·11
Yongala	1·24	0·67	14·37
NORTH-EAST.			
Yunta	1·33	0·59	8·44
Waukaringa	0·80	0·48	7·85
Mannahill	0·55	0·60	8·06
Cockburn	0·06	0·59	7·85
Broken Hill	0·08	0·65	9·37
LOWER NORTH.			
Port Pirie	0·67	0·66	13·16
Port Broughton	0·74	0·59	13·82
Bute	0·63	0·59	15·36
Laura	0·81	0·73	17·88
Caltowie	0·56	0·69	16·65
Jamestown	0·60	0·69	17·63
Gladstone	0·62	0·68	16·24
Crystal Brook	0·63	0·70	15·72
Georgetown	0·66	0·69	18·17
Narridy	0·82	0·55	15·66
Red Hill	0·80	0·62	16·54
Spalding	1·49	0·62	18·51
Gulnare	1·51	0·66	18·37
Yacka	0·76	0·52	15·34
Koolunga	0·52	0·61	15·21
Snowtown	0·91	0·62	15·67
LOWER NORTH—*continued.*			
Brinkworth	0·47	0·54	15·60
Blyth	0·72	0·70	16·68
Clare	1·45	0·89	24·42
Mintaro	1·91	0·67	23·27
Watervale	1·43	0·94	26·66
Auburn	1·60	0·98	23·89
Hoyleton	1·80	0·74	17·27
Balaklava	0·60	0·66	15·34
Port Wakefield	0·82	0·56	12·90
Terowie	1·87	0·74	13·29
Whyte-Yarcowie	1·10	0·74	13·55
Hallett	1·57	0·70	16·37
Mount Bryan	1·22	0·60	16·74
Kooringa	1·56	0·73	17·75
Farrell's Flat	3·74	0·74	18·51
WEST OF MURRAY RANGE.			
Manoora	2·03	0·65	18·87
Saddleworth	1·93	0·76	19·58
Marrabel	1·65	0·74	19·90
Riverton	1·41	0·75	20·80
Tarlee	1·23	0·75	18·06
Stockport	0·94	0·73	17·04
Hamley Bridge	0·75	0·75	16·50
Kapunda	2·16	0·84	19·71
Freeling	1·29	0·74	17·73
Greenock	1·67	0·78	21·42
Truro	1·20	0·73	19·72
Stockwell	1·48	0·71	19·98
Nuriootpa	1·94	0·79	20·77
Angaston	1·88	0·80	22·29
Tanunda	1·01	0·85	21·94
Lyndoch	0·74	0·75	23·17
Williamstown	0·78	0·91	27·41
ADELAIDE PLAINS			
Owen	0·91	0·54	14·83
Mallala	0·78	0·68	16·39
Roseworthy	1·14	0·71	17·37
Gawler	0·87	0·72	18·81
Two Wells	0·59	0·64	15·75
Virginia	0·65	0·69	17·17
Smithfield	0·56	0·53	17·62
Salisbury	0·56	0·69	18·49
Adelaide	0·61	0·74	21·17
Glen Osmond	0·63	0·91	25·84
Magill	0·91	0·83	25·24
MOUNT LOFTY RANGES.			
Teatree Gully	1·03	0·81	26·83
Stirling West	1·40	0·49	46·86
Uraidla	1·26	1·32	43·64
Clarendon	1·06	1·07	32·74
Happy Valley Res.	0·85	—	—
Morphett Vale	1·08	0·73	22·56
Noarlunga	1·27	0·58	20·35
Willunga	1·17	0·76	25·91
Aldinga	1·21	0·54	20·11

RAINFALL—*continued.*

Station.	For Jan., 1938.	Av'ge. for Jan.	Av'ge. Annual Rain-fall.
MOUNT LOFTY RANGES—*continued.*			
Myponga	1·15	0·71	29·45
Inman Valley	0·59	—	—
Yankalilla	0·42	0·57	22·70
Mount Compass	1·35	0·86	36·32
Mount Pleasant	0·75	0·89	27·02
Birdwood	0·51	1·00	28·86
Gumeracha	0·88	1·07	33·12
Millbrook Reservoir	1·03	1·13	34·00
Lobethal	0·81	1·03	35·79
Woodside	0·92	0·99	32·01
Hahndorf	0·80	1·06	34·65
Nairne	0·79	0·98	28·04
Mount Barker	0·86	1·03	31·17
Echunga	1·09	1·06	33·25
Macclesfield	0·80	0·93	30·29
Meadows	1·45	1·05	35·93
Strathalbyn	0·92	0·70	19·35
MURRAY FLATS AND VALLEY.			
Meningie	1·24	0·62	18·28
Milang	0·65	0·59	14·85
Langhorne's Creek	0·67	0·48	14·99
Wellington	0·52	0·71	14·68
Tailem Bend	0·70	0·60	15·19
Murray Bridge	0·42	0·57	13·51
Callington	0·25	0·67	15·14
Mannum	0·74	0·50	11·51
Palmer	0·56	0·60	15·70
Sedan	0·92	0·58	11·99
Swan Reach	0·70	0·50	10·60
Blanchetown	0·92	0·72	10·97
Eudunda	1·78	0·71	17·16
Point Pass	1·31	0·65	16·93
Sutherlands	0·83	0·45	10·73
Morgan	0·95	0·50	9·12
Waikerie	0·91	0·46	9·71
Overland Corner	1·48	0·54	10·21
Loxton	1·46	0·64	11·34
Berri	1·60	0·60	10·11
Renmark	1·02	0·54	10·37
WEST OF SPENCER'S GULF.			
Eucla	0·48	0·56	10·06
Nullarbor	0·40	0·34	8·79
Fowler's Bay	0·54	0·35	11·89
Penong	0·23	0·29	12·22
Koonibba	0·29	0·27	12·16
Denial Bay	0·10	0·20	11·31
Ceduna	0·18	0·20	10·30
Smoky Bay	0·50	0·22	10·42
Wirrulla	0·13	0·18	10·71
Streaky Bay	0·27	0·38	14·85
Chandada	0·26	0·19	12·31
Minnipa	0·32	0·51	13·83
Kyancutta	0·31	0·31	13·16
Talia	0·27	0·22	14·50
Port Elliston	0·33	0·36	16·44
Lock	0·30	0·44	16·23
Mount Hope	0·31	—	—
Yeelanna	0·26	0·22	15·92
Cummins	0·46	0·32	17·47
Port Lincoln	0·31	0·54	19·27
Tumby	0·33	0·28	14·16
Ungarra	0·16	0·32	16·81
Port Neill	0·16	0·30	13·06
WEST OF SPENCER'S GULF—*continued.*			
Arno Bay	0·23	0·38	12·72
Rudall	0·21	0·47	12·94
Cleve	0·38	0·52	14·90
Cowell	0·50	0·46	11·06
Miltalie	0·70	0·54	13·72
Mangalo	0·80	0·59	13·80
Darke's Peak	0·58	0·59	15·08
Kimba	0·68	0·38	11·64
YORKE PENINSULA.			
Wallaroo	1·48	0·53	13·93
Kadina	1·49	0·51	15·53
Moonta	1·19	0·50	14·98
Paskeville	0·79	0·56	15·47
Maitland	1·01	0·60	19·76
Ardrossan	0·48	0·47	13·91
Port Victoria	0·62	0·44	15·33
Curramulka	0·55	0·54	17·72
Minlaton	0·53	0·48	17·65
Port Vincent	0·23	0·38	14·26
Brentwood	0·37	0·33	15·52
Stansbury	0·28	0·53	16·75
Warooka	0·70	0·41	17·38
Yorketown	0·49	0·44	16·81
Edithburgh	0·70	0·47	16·31
SOUTH AND SOUTH-EAST.			
Cape Borda	0·49	0·58	24·83
Kingscote	0·08	0·44	19·20
Penneshaw	0·15	0·41	19·09
Victor Harbour	0·73	0·68	21·37
Port Elliot	0·97	0·64	19·93
Goolwa	1·22	0·65	17·85
Maggea	0·80	0·89	10·32
Copeville	0·95	0·58	11·64
Claypans	0·55	0·86	10·77
Meribah	1·03	0·75	11·26
Alawoona	1·09	0·80	10·43
Caliph	0·84	0·87	10·60
Mindarie	0·66	0·64	12·16
Sandalwood	1·08	0·76	13·67
Karoonda	0·59	0·60	14·33
Pinnaroo	0·88	0·53	14·14
Parilla	1·23	0·51	13·67
Lameroo	0·70	0·59	15·79
Parrakie	0·26	0·50	14·58
Geranium	0·48	0·54	16·36
Peake	0·54	0·60	15·87
Cooke's Plains	0·75	0·58	15·33
Coomandook	0·60	0·55	17·01
Coonalpyn	0·82	0·75	17·65
Tintinara	0·85	0·51	18·68
Keith	1·46	0·46	17·95
Bordertown	0·57	0·73	19·16
Wolseley	0·52	0·60	18·50
Frances	0·95	0·67	20·18
Naracoorte	1·32	0·79	22·64
Penola	1·19	1·00	25·89
Lucindale	1·65	0·72	23·48
Kingston	0·57	0·73	24·24
Robe	0·33	0·77	24·63
Beachport	0·97	0·84	27·06
Millicent	0·89	0·95	29·93
Kalangadoo	1·77	1·12	32·00
Mount Gambier	0·82	1·30	30·29

Agricultural Bureau of South Australia

Reports Received from Branches

Training the Working Sheep Dog.

[F. STAPLES (Mount Pleasant).]

It is of first importance that the pup be bred from the best working strain procurable. While individual members of the same litter may possess varying degrees of ability, yet it is only by breeding from the best that the best results can be obtained. Dogs of fame are indebted to the trainer's skill for much, but they owe a great deal more to the characteristics inherited from their ancestors. Training is merely the act of developing the desirable qualities transmitted from parents to progeny. Most dogs excel in some particular phase and are weak in others, even when brought out to the utmost. The chief qualification to look for is natural ability to run out freely, to lift sheep carefully, handle them gently yet firmly in a steady, forceful manner, together with a nice eye, and an inclination to lead. Having secured the pup, he must be well reared; the brains and intelligence cannot be utilised to the fullest extent unless implanted in well nourished bone and sinew capable of enduring hard work in puppyhood. At about 5 months old the puppy begins to follow. He must not be allowed to run along with another dog nor yet on scattered sheep. A few are steadied near at hand by an old experienced fellow, who generally on such occasions complies sullenly and views the pup's opening performances from the corner of a jealous eye. The pup is given a chance. He may run around and drop beyond. No more could be desired. An encouraging clap is his reward. But he may not run at all; worse still, he may run in, and give a demonstration that savours more of a scatter than gather. Pups have been known to do this and turn out good dogs. Should it happen, it is a little discouraging to the trainer, who calls him in, to allow him a further waiting period before being tried again. About this time he is allowed to act as the spirit moves him as long as his conduct is all right. Bring him along step by step as he acquires the motion. Any attempt to force a beginning pup only blunts his progress for a time, if not for ever. Persuade him gently until he makes a good beginning. When pressing work has to be done in a hurry the best plan to cope with the pup's awkwardness is to put him on a chain. This teaches him to keep at heel when the other dogs are working and also saves trouble from occasional bolts, when such would be more hindrance than help. He is taught one thing at a time; first to run around sheep; whichever hand he prefers he is allowed to take, and usually sticks to that particular side until he becomes keen, when he may be induced to run to either side. In running around, the dog should run well out. In fact a young dog cannot run too wide, so long as he is under control. Plenty of work will bring him close enough. Then he must halt when he "keeps," or lifts his sheep; if possessed of a strong eye he will sit down; but a dog may have a good eye with nice style and keep his feet. Whatever his style may be, it is proper that the halt be made when he is far beyond. Every trainer has his own method of directing and commanding his dog. One has only to witness a trial to observe this. The important point is to keep a word or whistle for each move. In order to assume command once the puppy is fairly started and keen, everything he is forbidden to do he should be firmly led to understand that he must not do. If allowed to slip once, he will indulge again, and will soon form a habit. Thus, for example, a harmless "nip," if allowed to go unchecked, may one day become a savage grip. The least sign of vice should be stopped while the dog is in the act of doing it; but he should never on any account be seized and thrashed, for this must take place after the offence is committed, and the dog has no idea what it is for. His temper must be carefully studied, and this is where the science of the trainer's hand comes in. The trainer first of all must be able to control his own temper and must have patience. If sheep come away when lifted the dog is allowed to follow. The ideal follower is one that comes straight up from behind with no weaving from side to side. Should sheep be stiff and stubborn the dog should not be urged on too much, for he is apt to come with a dash and cause trouble. This is one of the difficulties to be reckoned on with a dog with a strong eye. The only way to avoid the dash is to let him lie, and dodge a little nearer and lie until the sheep move.

The distance out may be extended as the pup becomes good in close range. A long run on a windy day affords him a chance of displaying some of his inborn qualities. Out of sight and hearing he is thrown on his own resources. He may cross the trail and run the foot until he sights them, and then there is a moment of anxiety for the trainer. If he lies out on a fine cast, and lifts gently, this shows his breeding and blood, and inspires confidence in the watching figures on the distant hillside, who well know the value of full points for a dog in a field trial. The fact was borne out while watching a first class dog under the control of a trainer who thought he could command obedience if only he threatened enough. Yet that same man, had he only been aware of it, was using orders which the best trained dog could not understand. A dog should never be commanded for the sake of proving the trainer's power over it. Command as little as possible and the dog will respond with a heartier will.

Lime Burning.

[W. H. Pfitzner (Yadnarie).]

A lime kiln may be made anywhere where the sinking is good, but not on sandhills, because the heat and the working at the pit will cause the sand to cave in.

A kiln should be built according to the quantity of lime wanted, and when full should be as high above the ground as its depth. A small disused underground tank is ideal for burning lime; it remains free from dirt, and when shovelling out there is a hard floor to shovel from.

After the kiln has been dug out a layer of about 1ft. of mallee boughs should be spread over the bottom, then about 2ft. of mallee stumps, 1ft. of lime stones not larger than 3in. or 4in., and this method continued—a layer of stumps and stones—until the top is reached, when it should be finished off with the largest and most solid stumps.

It is necessary to have vents at each corner and the centre. Hollow trees are ideal for this. When lighting a kiln, a gallon or two of petrol can be used to ensure a good start. In selecting the stones for burning lime, the harder the stone the better the lime will be, and the longer it will keep. White stones when burned will slake in about four weeks, but the red granite stone will keep for three months or even longer.

Discussion.—Mr. W. L. Brown declared that to burn lime in a pit was a waste of time, and also a most objectionable job to extricate the lime from the pit once burned. Good results could be obtained by burning above ground provided light timber was built into the centre of the heap to assure a good lighting of the kiln.

Mr. F. W. Jericho preferred to use a pit, suggesting that a greater and more even heat was obtained by following the instructions of the paper.

Mr. R. B. Deer considered that building a kiln on the top of the ground required a good deal more stumps, and thus more time and labour were required for the erection of an above-ground kiln. He asserted that the only advantage of the latter type of kiln was that the lime was more easily bagged once burnt. Mr. Deer also added that it was unnecessary to break stones very small. By throwing a few stumps on the top of the kiln after it had burnt down a little would ensure a better burn of outside stones. Finally a kiln should be burnt out within 48 hours.

Mr. Spriggs said that a steady fire was required for a good burn, and not too much wood should be used.

Book-Keeping for Blockers.

A Paper delivered at a meeting of the Waikerie Branch of the Agricultural Bureau of South Australia, on 27th September, 1937.

[By R. H. Hall, A.F.I.A., A.A.I.S.]

In opening this subject, it is desirable to go straight to the root of the matter, and ask ourselves "Why should a blocker keep books at all?". The average grower would probably reply "Because the law compels me to do so." It is true that there is a heavy penalty under the Bankruptcy Act (three years' imprisonment), for failure to keep proper books of account, but I hope that none of you will ever be affected by the provisions of that Act! It is also true that a penalty of up to £50 is provided by the Income Tax Acts for a similar offence, and this offence affects every grower.

But disregarding the legal aspect altogether, consider the fact that from time immemorial, business men have found it necessary to keep books or financial records of some sort. Primarily, of course, it is to ascertain whether the business was carried on at a profit or a loss for a particular period, and also what its assets and liabilities were—its financial position—at any particular time. But modern accounting systems go much further than this. In the case of a manufacturer, for instance, the accounts may be set out in such a way as to show precisely not only the total cost of each article manufactured, but the cost of each individual item of material, labour, and overhead costs which make up that total. Thus they demonstrate whether a particular article is being manufactured at a profit, or not, and also, whether waste or inefficiency are occurring, and if so, where.

What has all this to do with fruit-growing? Well, the production of fruit is just as much a business as, say, the production of bootlaces. None of you are growing fruit as a hobby—you are all trying to make a profit out of it. But how many growers know whether they are actually making a profit from the block as a whole, or from any particular part of it, or from any one of the varieties of fruit grown? It is here that the advantage to the fruitgrower of a good system of book-keeping becomes apparent. By its aid, one may discover whether a particular area is really paying its way, or not, and thus be led to make any alterations in one's methods that may be necessary. The accounts may even show that, in a particular case it would pay to grub out a certain variety and substitute something else, although in such an extreme case, one's own observations, as practical growers, of the trees or vines concerned, should be sufficient to guide the decision.

Glencoe Agricultural Bureau Field Day, 1st December

It does not necessarily follow, however, that maximum crops mean maximum net returns—the cost of production must be taken into account.

Take apricots as an example. The bulk of the apricots produced by many growers in this district in a normal year are of two crown size and standard quality. Now, the greater part of the cost of production of dried apricots consists of the harvesting costs, and these are largely made up of the cost of picking and cutting the fruit. It costs just as much to pick and cut a two crown as it does a four crown apricot, but as there may be twice as many of the former to a ton, the cost of harvesting two crown may be nearly double that of four crown fruit. Further, four crown are, of course, of considerably higher value than two crown of the same quality, and moreover, are usually at least a grade higher in quality. So that it is quite probable that two crown apricots are being produced at a loss, whereas four crown would show a profit. A good system of book-keeping would demonstrate this clearly, and lead the grower to take the necessary steps, by altering his methods of pruning, manuring, irrigating, or working generally, to attain the desired result.

Other examples of the use of accounts to guide one's methods will suggest themselves. For instance, an accurate record of the cost of growing fodder for horses would help to show whether it would pay to change to a tractor or not. So also with fertilisers. You all know they are necessary, but do not know the quantity per acre to apply to produce the maximum net returns in your case? And labour—the man who boasts of how much less labour he employs than his neighbour may find that the neighbour's net returns were better than his own, because of more thorough working; or the reverse may be the case. In all these, and many other ways, the keeping of proper accounts will save one from working in the dark, and throw a light on problems, sometimes a startling light, that will help one to attain increased net returns. And so we find that the answer to the question we asked ourselves at the beginning—"Why should a blocker keep books?"—is simply "Because it pays."

The particular form of accounts to use, however, presents some difficulty, as the requirements of all growers are not the same; and every grower would not, in practice, devote the time and care that would be required by the ideal system, compartively simple though that would be. Whatever system is adopted, however, there are two things I would strongly recommend. The first is to keep a diary, in which to record particulars of all work done and all material used on the block. This is essential to enable one to allocate costs of labour and material to the different varieties of fruit grown. Incidentally, any matters of interest appertaining to the block, such as weather notes, date of bud-burst and so on, could also be recorded. The information contained in a conscientiously kept diary will be found invaluable in future years, and will well repay the small effort entailed in posting it—once the habit is acquired.

The second point is to pay all amounts received into the bank intact. Do not cash any cheques received, and use the money, or any cash received, to pay expenses. It will then follow that all payments must be made by cheque—not necessarily one cheque for each payment—several small items may be paid by one cheque, but a record should be made on the cheque heel, so that the items may be entered in your cash book later.

The advantage of this is that cheque heels and pay-in slips form a written record, from which the cash book may be entered up at one's convenience and the bank pass book will be a check on one's bookkeeping. The bank makes a charge for keeping accounts, and one might as well derive some benfit from it.

If these two recommendations are adopted, and if, also, all requirements are paid for reasonably promptly, then bookkeeping can be reduced to a very simple matter indeed. A tabular cash book could be used, ruled with columns headed as follows:—On the Receipt side—Date, Particulars, Dried Fruit, Distillery Fruit, Citrus Fruit, Fresh Fruit, Other Receipts, Total, and Bank. The fruit columns could be subdivided into varieties as desired. Amounts received would be entered under the appropriate headings, and also in the bank column when paid into the bank. On the payments side, the headings of the columns would cover each class of expenditure, such as water rates, wages, fertilisers, and so on, set out with an eye to Income Tax requirements. There would also be columns for personal and household expenses, and of course, a bank column. Each cheque drawn would be entered in the bank column, and the items of expense covered by it at their appropriate columns. It is only necessary to total the columns at the end of the year to have a detailed statement of receipts and paymnts for the period. The difference between the two bank columns must agree with the balance at the bank as shown by the pass book. In addition to the wages column in the cash book, separate accounts should be kept for each employee, and there should also be accounts for livestock, implements, plant, and other assets subject to depreciation. These latter should be opened by entering the assets concerned at their value for Income Tax purposes, additions purchased during the year being added at cost, and items sold or scrapped deducted. Depreciation at the rate allowed by the Income Tax Department on each item should be written off at the end of the year. This could be well left for an income tax agent to calculate, and, incidentally, I strongly advocate the employment of such an agent, as by his specialised knowledge he may be able to save much unnecessary expense, both by obtaining all the deductions to which one is entitled, and by seeing that penalties for omitting assessable income are not incurred.

The system thus very briefly outlined represents the bare minimum requirements, but should be sufficient to answer the purpose in the case of the average grower, whose block is his sole source of income, or practically so, and who makes reasonably prompt settlement of his accounts. It is not a complete system, because it does not take into account income earned, or expenditure incurred, but not actually received or paid, during a particular period. There is no satisfactory substitute, however, other than the orthodox system of cash book, journal, and ledger, the operation of which requires at least an elementary knowledge of book-keeping, and which it is outside the scope of this paper to attempt to explain.

First-Aid on the Farm.

[E. A. W. Harding (Wirrabara).]

In any case of injury decision must be made as to whether the case is serious enough to seek advice from a doctor. A safe rule is "when in doubt call the doctor." Pending the arrival of the doctor is when first-aid knowledge is useful.

The natural tendency of passers-by to crowd round the stricken person must be prevented, and a free supply of fresh air must be available.

Do not attempt to make a fallen person sit or stand, as either position may cause grave injury.

The simplest accident is that of fainting. This is due to insufficient blood supplied to the head. Therefore the head should be lowered and tight clothing about the neck and chest should be loosened. If there is bleeding some one should put a thumb on the cut and keep it there. In case of fainting alcohol will do good, but if there is bleeding the alcohol will increase the haemorrhage and so do harm, whether the bleeding is visible or invisible as in an apoplетic fit. Therefore, unless the person rendering first-aid is quite competent to distinguish between simple fainting and more serious conditions, alcohol most certainly should be withheld.

One result of accidents in general is what is called shock. Next to bleeding, shock is the most important thing to control. To this end efforts must be made to make the patient warmer by extra clothing, chafing hands and limbs, &c. The signs of shock are that the patient becomes pale and the skin is covered with cold perspiration, the pulse is weak and rapid, the breathing is weak and irregular, and though consciousness is usually retained there is torpor or restlessness. Warm or hot tea or coffee may be given if the patient can swallow, but if there is any possibility of bleeding going on no liquid should be given.

Concussion is a type of shock caused by injury to the brain, generally from a blow or fall on the head. The symptoms of concussion are generally a more confused and bewildered state of the patient or complete unconsciousness. Treatment is as for shock.

In cases of sunstroke or heatstroke generally the patient falls suddenly insensible, the skin feeling burning hot to the hand. Carry patient into shade or coolest spot. Give plenty of fresh air. Raise the head and remove clothing from neck and chest. Sprinkle with cold water. Do not give stimulants.

Suffocation by smoke or gas if not prevented will cause death by asphyxia. Remove the person into the fresh air and restore breathing by artificial respiration if necessary. In rescuing from fire tie a wet handkerchief over the nose and mouth before entering a building on fire. As the air is clearer near the floor, bend as low as possible to avoid being overcome.

In case of burns exclude the air as quickly as possible. Any vegetable oil may be applied by soaking a piece of rag in oil and covering the wound.

For animal bites if the animal is healthy wash the wound with warm antiseptic lotion. If the animal is rabid or if snakebite, stop circulation by applying a tourniquet. This is made by placing a pad over the artery and applying pressure by putting a stick through the loop round the limb and then twisting. A tourniquet should not be left on more than half an hour otherwise the tissues may die. Encourage bleeding, wash with warm antiseptic lotion. Stimulants may be given.

For sprains and bruises apply cold applications. Rest the sprain.

In cases of fractured or broken bones do not move the patient before the injured bone is fixed by splints. Splints may be made of any solid material—wood, iron, bark, or similar material. Pad the splint with cloth for comfort.

For poisoning call the doctor at once saying "a case of poisoning." Two main principles to bear in mind in treatment of poisoning are to remove the poison already taken, if possible or advisable, and to try to lessen the effects by giving an antidote. In corrosive or acid poisoning do not give emetics. Scrapings from whitewashed walls or ceilings may be used in emergency for acid poisoning. Vinegar is the safest acid to administer. In irritant poisons give emetics to encourage vomiting. An emetic promptly administered may save the patient's life, but one must not be given in the case of corrosive poisoning. An emetic may be made from warm water containing one tablespoonful each of mustard and salt to each tumbler of water. Systematic poisoning—strychnine, arsenic, opium, chloroform, prussic acid—need an emetic. In case of drowsiness the patient must be kept awake by being walked about, cold water being freely used and hot coffee given. Artificial respiration may be resorted to.

Foreign bodies lodged in the eye, either on the eyeball or under the lids, cause discomfort and if not quickly removed give rise to inflammation and great pain. For treatment prevent the patient rubbing the eye, and carefully examine the eye by opening the lids; if the foreign body is visible it may be removed by gently brushing it away with the folded corner of a handkerchief. Lime in the eye is a very serious accident. Quickly fill the eye with olive or castor oil; remove the pieces of lime with greatest gentleness, but do not use force as serious damage may follow.

In case of drowning send at once for medical assistance, stimulants, and dry clothing, but proceed to treat the patient at once to remove all obstructions to the passage of air to the lungs, to restore breathing, and after breathing is restored to promote warmth and circulation. To restore breathing put yourself astride or one one side of the patient's body in a kneeling position facing the head. Placing your hands on the small of his back with the thumbs parallel and nearly touching and the fingers spread out over the lowest ribs, lean forward with the arms straight and steadily allow the weight of your body to fall on your wrists and so produce a firm downward pressure (which must not be violent) on the loins and lower part of the back. This part of the operation should occupy the time necessary to count slowly one-two-three. Then backward rapidly releasing the pressure when air will enter the lungs. Do not lift the hands from the patient's body. This should occupy the time necessary to count slowly—one—two. These movements should be continued till natural breathing has commenced. Then remove to shelter and promote circulation. Encourage the patient to sleep, but watch carefully for some time. Further rules are:—Prevent unnecessary crowding round the patient, avoid rough usage, do not hold patient up by the feet, do not place the patient in a warm bath unless under medical orders.

As can be seen from the treatment of various accidents, a first-aid cabinet is necessary on a farm. This should contain the equipment for those cuts, bruises, and other injuries which come at unexpected moments. The following should find a place in this cabinet:—Bandages, cotton-wool, scissors, safety pins, tweezers, eye-dropper, adhesive tape, vaseline, Condy's crystals, sal volatile, boracic powder, tannic acid, castor oil, methylated spirits, salt, and mustard. Pasted inside the door of the medicine chest should be a card showing what to do in case of emargency, also the telephone number of the doctor.

Destruction of Noxious Weeds.

[M. T. Masters (Roberts and Verran).]

The most commonly known noxious weeds of this district are:—Three cornered jacks, horehound, Apple of Sodom, wild turnip, and boxthorn.

All of these weed pests can be destroyed either by frequent cultivation or by grubbing each plant separately; the latter is the best and surest method to adopt. In this district too much working of lighter soils causes drift, which is nearly as bad as the weed itself. Three cornered jack is a very hard weed to check. Sheep are the worst broadcasters of seed of that type, it clinging to the wool and dropping on any part of the farm. When first seen on the farm this weed, like all others, should be kept under control, otherwise all the working and hoeing would be useless as it spreads rapidly. Sheep will eat this weed at certain times, more so when it is drying off.

Horehound has found its way to this district. On some holdings it is growing too thickly for other feed or crops to grow, which shows that if allowed to increase, it will in a few years' time choke out every thing growing in the way of feed, which will be a dead loss to the farmer. By experience, grubbing each plant separately does not spread the seeds, providing the plants are put in a dray and heaped up and burnt when dry. It will be argued that stock will eat this plant, but my experience is that nothing has eaten it.

Horehound grows to a height of 3ft. in some cases, but the average bush is about 18in. high. There are two species, one a light-grey colour, and the other a dark-green with a crinkled leaf. This species does not grow to any height.

Apple of Sodom is rare here but has been known. These bushes have been killed when first seen, and by so doing were easily checked before gaining a hold. This bush grows about 9in. high, has prickles similar to a rose thorn, only thicker and longer, growing on every stem, also on the backs of the leaves. It has a small yellow flower.

Wild turnip is found in places in this district, but through farmers pulling it up when first seen, its progress has been checked, which shows that if all noxious weeds were treated in the same manner we would not be troubled in any way with them. Every one knows what the boxthorn is. The only way of killing it is by pulling out every root when grubbed, otherwise the smallest root grows, if any are left in the ground. When they are too big to grub, tie a strong chain around the butt and pull them out with a horse or tractor. Birds and floods are mostly responsible for the spreading of this bush.

Farmers should be careful where they obtain their seed wheat, etc. That is one of the most common ways of obtaining noxious weeds, which grow high enough to be reaped at harvest time, and so passed on to another farmer without him knowing of their presence at the time of purchasing his seed.

Hand Feeding and Caring for Stock.

[J. Hollitt (Wirrabara).]

The first thing to do when starting a herd of any stock is to purchase the best female or females that can be got according to a person's means, and then use the best sire obtainable. Of course, it is always best to buy young stock if one is in a position to do so, but good results may be obtained by purchasing aged well-bred cows that have proved themselves to be good milk and cream producers. The next thing is to see that they are well fed and cared for. Cows do best on natural food, that is, when they can get plenty of it to fill themselves in a short time and then lie down and chew their cud.

It is a good thing to have plenty of good clean straw stacks. While the stacks are being built salt should be added by making a strong brine and sprinkling it on each layer or load. It can be improved on by adding molasses and pollard. Stock that have plenty of greenfeed, such as clovers and lucerne or any green feed, and have free access to the straw stack will go there and eat a fair quantity of straw each day, especially in cold wet weather, even if the straw has had nothing added to it. When natural feed is scarce if cattle can get plenty of straw treated as mentioned above they will thrive on it.

Cows must always have plenty of good clean water, and will do better if they can have it when required. My experience is that cows usually come to the water trough after they have had a feed between 10 and 11 o'clock, have a drink, and then lie down for several hours according to the weather.

If milking cows cannot have sufficient natural grasses to fill themselves and to lie down and chew their cud, they must be artificially fed to get the best results from them. Good ensilage is one of the best feeds. Half hay chaff and half wheaten or cocky chaff mixed well together, damped and well mixed with bran, pollard, and crushed oats, makes good feed for milking cows, while they must be fed and milked regularly to get the best results from them. Cows that are neglected soon go dry or fail to keep up the supply.

The Calf.—Leave the calf with its mother for the first 24 hours; it is necessary for the calf to have its mother's milk for first few days, and the milk is unfit for human consumption. When the calf is taken from its mother, place it in a pen away from her so that it cannot get in contact with her, and then they soon forget each other.

Do not feed the calf for the first 24 hours after it is taken from its mother. Then it will be very hungry and will take the milk much more readily than if one attempts to feed it shortly after taking it from the cow. Give the calf milk from its own mother for four days. After that add a little separated milk when feeding, each day increasing the quantity of separated milk and giving less whole milk, until at last it will do well on all separated milk, especially if it is given chaff with concentrates added. If the calf has plenty of green feed it will not need so much chaff, etc., but a little dry feed added is a great help in keeping the calf growing.

It is a good thing to have a calf paddock securely fenced to prevent them sucking through the fence. Special care should be taken in this direction for the first few weeks. If a calf gets to and sucks its mother after it has been taken away several days it will be very troublesome to wean. When a calf sucks its mother say a week after, it will not drink the milk given to it properly, and naturally it will not thrive so well, and the cow will hold her milk for the calf. It is also necessary to provide the calves with shelter such as a shed or straw stack or both. If that is done the calves will be ready for market much earlier than they will be if unprotected from bad weather.

Pigs.—Pigs will consume all the separated milk and refuse from the kitchen and farm and convert it into valuable food for human consumption. The once favoured pig, viz., the pure Berkshire, has practically gone off the market, except for breeding purposes, crossed either with the Large White or the Tamworth. The Berkshire pig is not proving to be the right pig for export, but there is a good demand for either the Large White or Tamworth cross.

Feeding Pigs.—The best food is cow's milk and corn of any kind, such as barley, oats, peas or wheat. Corn is rather expensive at the present time, but to keep pigs in any quantity, it is necessary to have pig-paddocks well fenced and to grow green feed for them. It will save a lot of time and labour in feeding the pigs and cleaning out the sties, and they will not require much corn if they can get plenty of green feed until they are being prepared for market or slaughter. The better the pig is fed the sooner it will be fit for the market. See that sows have plenty of feed and drink. Like the cow, the sow cannot supply milk and nourishment unless the necessary food has been given to her. When skim milk is scarce, add pollard and bran or crushed corn to the water. With a good warm shed in winter and shade in summer the sow will pay for the labour.

Raising and Care of Fat Lambs.

[M. D. Wright, Boor's Plains.]

It is recognised that for the successful cultivation of wheat sheep play an essential part on the farm. The Merino is generally recognised as the most profitable sheep for a dry climate. When purchasing sheep for breeding purposes, avoid buying old sheep. They are hard to fatten, and often will not breed a lamb, and their wool is generally light and unprofitable. Select ewes that are clean-faced and without tail wrinkles, and with large frames with long roomy barrels. The wool should be of a fine bright texture; dingy yellow and heavy-woolled sheep are more liable to blowfly strike than the former. Wherever possible avoid face and tail wrinkles. It is admitted that a sacrifice of a certain amount of wool is made by breeding away from wrinkles, but the object is to avoid more serious trouble in the form of grass seeds and blowfly strike. If sheep, and particularly lambs, are badly affected with grass seeds—and this frequently happens with the face-wrinkled ones—their growth is retarded, the constitution weakened, and they become a prey of the blowfly. The best age to buy ewes for breeding purposes is from 4-tooth to a full mouth. If a permanent flock is kept, cull the aged sheep every year, also cull coarse, hairy-woolled sheep. If there are not too many it is a good plan to kill them off for rations. Endeavour to make the flock as even as possible, both in type and in wool. This will obviate the necessity for much classing at shearing time.

The Sire.

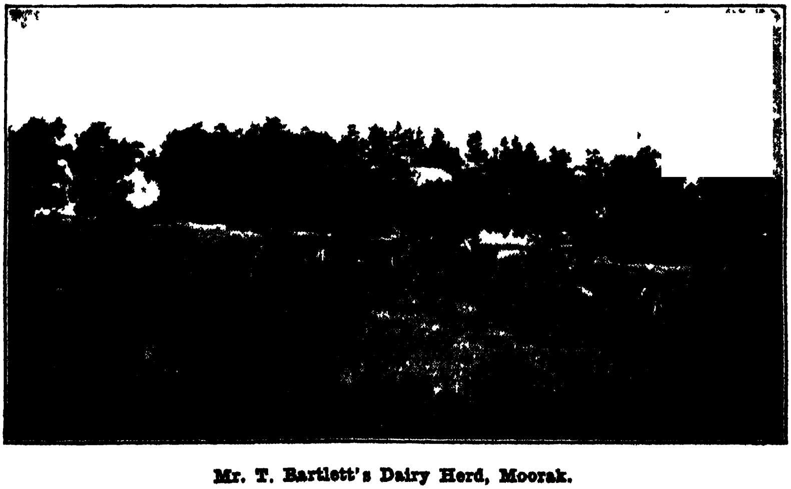
Too much cannot be said about this asset to a farm flock. When selecting a sire, choose one that conforms to type; one that has strength and character. Procure rams two or four tooth, for it is at these ages that you will obtain the best results. Old rams become fat and lazy, with the result that lamb percentages drop back.

Good rams should be the aim of all flock owners, for on them to a great extent depends the finished article. A ram, however well bred, lacking type and characteristics can never produce a high-class, well-finished lamb. Money spent on good, sound, true-to-type sires, will invariably repay for the original outlay; and for successful fat lamb raising the sire must be a predominating figure. There are several different breeds of rams suitable for mating with Merino ewes, among them being Southdowns, Shropshires, and Suffocks. The Dorset is one well suited for this district. However, opinions vary, and the point to be stressed is that whatever the choice of sires might be, select the best that is possible. For raising fat lambs use large-framed Merino ewes of the right age crossed with a Dorset ram. The Dorset cross develops quickly and at an early age should be ready for market. This lamb handles well and does not waste or lose bloom like the pure Merino, and on account of weight and size realises a good price. The ewes chosen for breeding should be put in a good paddock, separate from the other sheep, and the rams put with them. Rams should never be put in any later than early December. This will procure an early lamb, which will be well grown in the spring, when feed is good. After the rams have been mated with the ewes it is an excellent idea to yard them in a small yard or paddock over-night. This will give a better lambing percentage and more even lambing. During the mating season good feed and plenty of water are essential. This will keep the ewes strong and fit, and will enable them to rear a good lamb. A month prior to lambing the ewes should be brought in and crutched, preferably with machines, and the rams should be removed. When crutching ewes heavy in lamb, handle as gently as possible; do not excite them unnecessarily with dogs in the yard. Crutching gives the lamb a better chance of finding the teats when it is young. It also lessens the danger of blowfly strike during the critical lambing period. When the lambing season commences the ewes should be inspected once a day to see if any of the ewes are down or need attention. When young ewes are mated with some breeds of British rams, very often at lambing time some trouble is experienced with the large head and fore quarters of the lamb. If this occurs in a flock constant attention is necessary, otherwise several ewes and lambs may be lost in a short time. At the lambing period, dogs should be kept well away from the ewes and paddock. A good plan, if possible, is to shift the ewes with the strongest lambs from the lambing paddock to a fresh one. This can be done when the lambs are a week or more old. The time taken in doing this is well worth while, and it will amply repay for the trouble taken Changing the ewes and lambs to a fresh pasture where the feed is better enables the ewe to give more milk, and the lamb will grow stronger and faster. It is never advisable to place a ewe with a lamb on dry feed. If the occasion arises when there is a lack of feed experienced in a dry season, and hand feeding has to be resorted to, then it is necessary for the ewe to be given food that will make milk for the lamb. Otherwise it is just as well to sacrifice the lamb to save the mother. Barley used correctly is a good fattener, but it is not any good for ewes and lambs. Crushed oats will prove more beneficial and will help to stimulate the milk supply, which is necessary to the growing lamb.

MARKING OPERATIONS.

Before tailing operations are commenced yards should be attended to so that the lambs cannot escape and cause unnecessary chasing. Lambs three weeks old are generally strong enough to stand tailing. The younger they can be operated on with safety the better, as the after effects and healing pass off more quickly. If tailing operations are performed with a knife, it should be well ground and sharpened beforehand and thoroughly sterilised.

Farmers generally are lax in the matter of sterilisation, but the time will come when this matter will have to be treated thoroughly, and all instruments used will have to be treated before and after use. The day set apart for this job should be one of moderate temperature. The lambs should be yarded early, treated as soon as as possible, and turned out again with the ewes in the early afternoon. This will then give the ewe time to find and mother her lamb before darkness sets in. Avoid cutting the tails too short when marking lambs; this increases fly trouble, and when marketing the lamb does not tend to give



Mr. T. Bartlett's Dairy Herd, Moorak.

that pleasing finish that is necessary. When marking in cool weather an antiseptic is not necessary; but in warm weather when flies are prevalent it is advisable to use Cooper's Milk Oil Fluid or some other thin medicated oil to protect the wound. Do not use any preparation such as Stockholm Tar that is liable to close up the wound too soon; this will cause blood poisoning. An inspection of the flock should be made, if the day after tailing is hot and sultry. Some of the lambs may have been struck and would need immediate attention. After tailing operations have been carried out the flock should be left to settle down for two or three days before being moved any great distance.

The following points are worth remembering if farmers are going to produce the lamb that is required by our home and overseas markets:—Careful selection of ewes and rams; sufficient feed and water at all times; observing the correct mating period for seasonable lambs; careful handling of ewes whilst pregnant; crutching before lambing; hygienic marking or lambs.

Farm Gates.

[A. F. Crossman (Warcowie).]

Farm gates are very often neglected. Often we see three or four barb wires pulled across in place of a panel, and more time is spent in opening and shutting them in a few days than it would take to make a proper panel. A very good panel can be made of three or four mallee sticks and five or six wires. If the panel is narrow, three uprights will be enough, but wider ones need four, one at each end, and two at equal distances between. Some fasten the wires to a post, but it is preferable to fasten them to an upright stick. The stick is then fastened to the post top and bottom, which allows it to turn when the panel is closed, thus saving the wires from bending each time, as this will eventually tend to break them. A very good fastener for a panel is to bore a hole through the upright stick about a foot from each end, and then fasten the double wire loosely through these holes having first threaded it through the lever stick. The hole through this stick should be bored four or five inches from the end. A mortise is then cut in the gate-post on the outside, and the short end of the lever is placed in the mortise and pulled back and fastened with a loop to the centre wire of the fence. This keeps both top and bottom of the panel at the same tension. Of course, the iron or pipe gate is the ideal, but as these cost money, we have to put up with the panels. If one has a forge, a few old worn-out tyres will make good gates. In this country, where white ants are so bad that wooden gates are a waste of time and energy to erect, it is a wise plan when hanging iron gates to fasten the gate to a separate post, not attached to the fence. If one could afford it, all gates in sheep yards, horse and cow yards, should be of iron or piping.

Trees for Ornamentation and Shelter.

[H. B. White (Monarto South).]

As the methods of farming change, matters formerly disregarded come into prominence. So we find to-day that there is a definite swing to diversified farming, and that trees either native or cultivated are looked upon as a real farm improvement. They are an improvement for the following reasons:—

(1) They improve the appearance of a farm.

(2) They provide shelter for stock in summer and winter.

(3) They break the velocity of wind and thus reduce wind erosion and crop damage.

That stock appreciate timber is proved by the way that they seek the shade of isolated trees in hot weather, and the shelter of belts of timber during cold winds in the winter.

Experienced stockmen claim that stock that have protection from the weather do much better than those that are not so fortunate. Since trees are of value when clearing land, odd trees that show promise of developing a spreading habit should be left. Once the undergrowth and scrub is cleared from around them most kinds of trees will make better growth, and in this way even the usually stunted scrub mallee can be induced to develop into quite a useful shade tree. When leaving isolated trees on land that is liable to drift, avoid the native pine. After a few years their surface roots will become exposed to the sun and weather, and once this happens they invariably die. All trees that have been left for shade should be kept free from such parasites as mistletoe; this will either kill the tree or reduce its vitality to such an extent that a big proportion of its leaves will drop off, and thus its value from the shade standpoint is reduced.

Where the native trees have been destroyed and others have to be planted, there is quite an assortment of trees that are suitable for this district. Amongst those recommended are Sugar and Tuart Gums, Aleppo Pines, Pepper Trees, and Tamarisks.

When planting trees dig a hole about 2ft. square and about 1ft. deep. Put the good surface soil by itself so that it can be used when planting. When the hole is cleaned out, break the bottom soil with a crowbar. When the tree is to be planted, first of all half fill the hole with earth. Make a small mound in the centre of this, place the tree upon this and gently spread out the roots, being careful to see that the ends of the main roots are pointing downwards. Then fill in the hole with earth to a depth of about 2in. or 3in. above that portion of the trunk from which the roots are growing. Press the earth firmly about the roots. Leave the surface in a loose condition. Use only good surface soil for filling in the hole, and this should be in a well-pulverised condition and damp—not wet and sloppy. Choose calm, dull, and damp weather for planting. After the trees have been planted put windbreaks around them; strong wind is detrimental to young trees. Keep the trees free from grass and weeds, and if the weather is hot and dry, water them regularly. The first two years is the critical period in the life of a tree, and extra care during this time is necessary. If trees are to be staked this should be done as soon as they are planted.

If trees are to be planted around a building they should be placed at some distance to prevent leaves falling in the gutters and possibly limbs falling on the roof. Also remember that roots will always make for water, consequently trees should not be planted near wells or underground tanks.

The Sheep Dog.

[A. Rogers (Marama).]

The sheep dog should be given every consideration where sheep are used as a sideline to wheat farming. The first point to be studied is the way in which the dog is meant to work. Then the breed of dog should be studied. If the dog required is to be used mainly as a paddock dog I prefer the Red Kelpie, which is more of a shy worker and will, in most cases, work wider, thus having a tendency to bring the sheep in much steadier than the general yard dog. It is not likely that a clever paddock dog will be a clever yard dog, so if the dog is to be used mainly for a yard dog I would suggest the Border Collie as the main dog. This is generally a closer and faster worker but harder to command than the Red Kelpie. In any case it is wise if one wants cleverness to get hold of a well bred pup. Mongrels may make useful workers but will not, as a rule, show much cleverness. To get the best out of a dog it is necessary to have command over it at all times. This is very important, especially in a paddock dog. This can be brought about by being firm but not rough while one is taking the dog about the paddock. It is not always wise to leave the training of a dog until he is with the sheep, or the dog may get excited and have to be treated much more firmly, this being inclined to make a coward of him. To make a clever worker it is most important for the trainer to see the clever points as well as the faults and make the dog aware of the fact. Teach the dog to bring everything to you. This can be brought about by working the dog on the opposite side of the flock, thus making the sheep work towards the trainer. If the dog does not seem eager, a good plan is to chain him up and keep a few sheep handy, in order to take the dog straight from the chain to the job. When the sheep are yarded it is a very good plan to run a few out as though they have broken away and let the dog bring them back. This done a number of times will be time well spent. Never forget to notice the good points of a dog's work, or neglect to make them known to the dog. Be firm, but not rough; rough handling will often spoil what should be a clever dog. Never let the dog chase rabbits or birds; or it may happen he will grow so fond of it that he will neglect his work for a chase.

Lmproving Our Older Farms.

[A. R. Smith (Miltalie).]

In this district as well as in other districts scrub is allowed to thrive wherever implements are unable to be worked. Practically every rise is covered with scrub that is neither use no ornament, yet the farmers pay rates, rents, and taxes on this unimproved land. Now it is in this scrub that vermin live and breed, especially rabbits. No man has a chance of clearing his place of vermin where scrub exists, yet when these hills are cleared it is there that the best pasture grows. The pasture grows best on the southern and eastern slopes. Lucerne will do well amongst stones if broadcast there with early rains. Again along the banks of creeks scrub is allowed to grow, which is a big mistake because when in flood the leaves and sticks accumulate against the fence, which is eventually washed away. Of course, necessary scrub should be left to supply adequate shelter and shade for stock, especially near the trough or dam. Most farmers are of the opinion that if they clear the hills they will run too much water and wash trenches, but this has been proved wrong, because when the pasture grows and it is not over stocked the grass land will run less water than the scrub. Some districts should be supered more heavily than others. Top dressing is a thing that we do not pay enough attention to, probably due to our low land values. The land that has been top dressed will grow a bigger quantity of much sweeter food. The first year after top dressing one may not see any improvement, but in the following year the difference will be very distinct. The most successful farmer is the man who gets a big production from a small area.

Discussion.—Mr. W. G. Smith thought it was a mistake to leave grazing land not top dressed. Clearing the scrub from hills was helping to keep down vermin. Mr. D. G. Ramsey also believed in clearing all hilly country. Mr. J. R. Story favoured top dressing on farms used for wheatgrowing, because a little extra could be sown when seeding wheat or oats. Mr. R. G. Ramsay raised the question of clearing sandhills, which he thought was wrong, because it might cause drift. Mr. A. R. Smith in replying said that a strip of scrub could be left on sandy soil, which would be sufficient for shade and would combat the drift.

Grasshoppers.

[J. G. Bennie (Wirreanda).]

In recent years grasshoppers have in this district become one of the greatest problems that confronts the man on the land. There are different types of grasshoppers, but the most familiar are those known as the "Wandering" hopper and the "Swarming" grasshopper.

The difference in these two species is that the swarming hopper's eggs will hatch at any time during the year, whereas the wandering hoppers, who make their appearance at more frequent intervals, will hatch only once a year at a certain period, namely, during early spring, should conditions be suitable. A grasshopper will lay as many as 36 eggs in a batch, and the life of one is approximately 12 weeks. They are most prevalent in dry seasons, and have during the last 12 years, on several occasions, turned what would have been moderately fair years into total failures, and have in this district been the major cause of soil ersion.

The most practical way in which the hopper can be attacked is that of poisoning with arsenic, bran, and molasses. The quantity required to 1lb. of arsenate of sodium is 48lbs. bran, 8lbs. molasses, and 4galls. water. Dissolve the arsenic in a gallon of boiling water, and the molasses in cold water. A suitable receptacle for mixing is a 100gall. galvanized tank minus the top. 48lbs. of bran is enough for one mixing, as care should be taken to mix it thoroughly, and to do this for the above-mentioned quantity requires about half an hour.

No more than the quantity of water stated should be used or it will make the bran stick in lumps, which will increase the danger of poisoning other stock. A bucket is most suitable for broadcasting the poison, which should not be laid out until late in the afternoon; it will not dry so quickly over night as it would if laid out in the morning.

It is not possible to accurately estimate how thick the poison should be laid; one must use his own discretion, but one bag of bran is enough to cover about one acre, and sufficient to poison 7,128,000 grasshoppers. After the hoppers hatch they usually swarm into small areas, and so remain for about four weeks, and it is during this period that they can be most successfully destroyed.

They can also be poisoned after taking to the wing, but it is during the hopping stage that they usually do most damage as the feed and wheat is green and more digestible. That this problem should interest every landholder in this and other districts goes without saying. It has been definitely proved and is an accomplished fact that the hoppers can be poisoned, and it is the responsibility of every landholder to do everything within his power to exterminate our greatest pest.

Formation of Soils.

[W. Crispin (Yadnarie).]

In the first instance soil is formed by the breaking up of rocks due to the eroding forces of Nature which may be divided into two groups namely, mechanical and chemical. Of these the former is the most important. Differences of temperature, or heat and cold, have a great effect upon the rocks and their disintegration, by causing them to expand and contract, thus making them split. Wind is of next importance in carrying away the broken particles and depositing them further afield. As these wind-borne fragments come in contact with other rocks they file them away. Over a long period this action is very widespread. Water also plays its part in this great work. Rain in falling washes away the particles with the pull of surface film. The roots of plant life also break up rocks, while man in his tillage of the earth grinds the soil into finer particles. The chemical process is at work in conjunction with the mechanical forces. The air contains gases—oxygen, nitrogen, and carbon dioxide. The lastnamed dissolves in the rain as it falls, forming a weak acid, and this supplemented with the acids from dead vegetation form a powerful agent in disintegrating the rocks. The effect of oxygen in the air can be seen in ironstone areas.

The term "soil" means the surface layer of the earth affected by cultivation. It is of a fine texture and dark in colour owing to the amount of humus it contains. In it the greater part of bacterial activity takes place making it rich in plant food.

The subsoil is that part below the portion affected by cultivation. Its chief function is to conserve the moisture, which man aids by suitable cultivation methods. It is usually of a harsher and sourer nature owing to the absence of sunlight and air. This, however, does not detract from its value as a conserver of moisture.

The chief constitutents of the surface soil are clay, lime, and humus. The amounts of these vary according to the locality and climate. Clay may constitute up to 80 per cent. or 90 per cent. of the content of the soil. In it the greater portion of bacterial activity takes place, forming the chief source of plant food. The particles are of a finer nature, therefore its capacity for holding water on the surface is greater. If soil contains less than 50 per cent. of clay, then it is likely to be poor, light, and lacking in moisture; if over 80 per cent., the land will be heavy to work, will puddle when wet, and settle extremely hard in dry periods. Lime is another important constitutent of soil, which usually has from 1 per cent. to 6 per cent. in its formation. In limestone areas the content is greater; even up to 80 per cent. It is very essential for healthy bacterial action. It renders heavy clay soils open, but an excess of lime will make soil too open, and cause it to drift.

Humus.—Organic matter is of an entirely different nature from other soil constituents, being formed by the accumulation of animal and plant residue in various stages of decomposition. No soil is complete without it. It renders heavy clay soils open and free, binds sandy soil, giving it a dark and rich colour, and at the same time increases its moisture-holding capacity.

Shoeing Horses.

[W. H. Zinkler (Yadnarie).]

Farmers in this district are practically compelled to shoe at least some of their horses at certain periods of the year, especially at harvest time. If tender-footed horses are driven over stony ground they will not only steady up in pace, but will lose their condition in a very short time. Two things must be taken into consideration before shoeing a horse; firstly a horse's hoof is not a block of wood, and secondly, fit the shoe according to the hoof and not the hoof according to the shoe. I prefer to make the shoes; factory bought shoes are always too long, and at least half an inch has to be cut off. This means that the back nails come too far back on the heel of the hoof, causing the shoe to pinch the horse, and they have no value in keeping the shoe tight. Two nails on the front of the shoe alongside the tip will hold more than will four nails on the heel.

To Make the Shoe.—Measure the hoof from toe to heel. For instance, if it measures 7in., cut off the iron 14¾in., allowing ¾in. for bending in the case of draught and ½in. for a pony. If these measurements are observed, it will be found that when the shoe is finished it will be exactly the required length. For a draught horse use ⅞in. x ½in. iron, and for a pony use ¾in. x ⅜in. iron. Having cut the four pieces to the right length, put a centre-punch mark on the front side in the middle where the tip is to be so that no mistake is made when bending. Now put two pieces in the fire—the front shoes—heating half at a time, so that half a shoe is worked out at a time. When the iron is hot, point the end to half its width, and hollow out the shoe so that only the crown of the hoof rests on the shoe. Then bend it, making sure that the iron is properly hot to obtain a neat and even bend. Then punch the holes. The first holes are punched alongside the tip, and the other holes are about ⅝in. apart. This finishes half the shoe. The other half is done exactly the same, after which the tip is worked on and the two front shoes are finished. The hind shoes are worked out on the same lines, except that the shoes are bent shorter together in the front at the tip, the inside of the shoe being practically straight, with the end bent in so that it does not project from under the hoof and the outside bent round more or less in a sweep, according to the shape of the hoof. For punching the holes have two punches made of good quality steel to ensure sharp cutting edges. The first punch to be used is the size of the head of the nail; the other is a thin punch the size of the nail which punches the hole right through. Then turn the shoe over and punch open the holes from that side. It is of great importance to have the punches of the right size; if the holes are punched too big the shoe will be loose in a very short time after shoeing.

Shoeing.—First of all rasp the hoof level, especially the heels, so that very little weight of the heel comes on the shoe. Then take the toe knife and hollow out the hoof so that only the crown rests on the shoe and take out a small gap where the tip is to go. Then hold the hot shoe on the hoof burning it only enough to show that the shoe rests on exactly; unnecessary burning will make the hoof brittle. The shoe is now ready to be nailed on. Place the nails with the straight side towards the outside of the hoof and then hold the pincers under the nails where they have been turned off, and hit on each nail head, causing the turned-off end of the nail to turn slightly over. Then bring the horse's leg forward, rest it on your knee, run the rasp along the bottom of the nail, and bend it over with the hammer, at the same time holding the pincers on the head of the nail so that the nail is not driven back whilst bending. Then trim off hoof with the rasp where necessary.

Activities of Women's Branches

RENDELSHAM.

The Secretary, Mrs. Z. Bignell, reports that the Branch held a very successful Flower Show on 27th October. The function was opened by Mrs. H. Stuckey, and Mesdames Magor and Wiltshire, of Millicent, acted as Judges. At the December meeting the President and Secretary were presented with gifts in recognition of their services to the Branch.

SADDLEWORTH.

Members met at Mrs. Webb's homestead on 2nd November, and Congress reports were discussed. The Branch provided afternoon tea on the occasion of the "Crop Inspection held by the Men's Branch. (Secretary, Miss G. Frost.)

SHEOAK LOG.

Thirty-four members attended the November meeting, when Miss Nott, of Myers Ltd., gave an address and demonstration on "Beauty Hints." Four new members were enrolled. Mrs. Dunks gave a Cake Icing Demonstration at the meeting held on 9th December. (Secretary, Miss K. Koch.)

STRATHALBYN.

Sub-Committees were elected for the Bureau Exhibit at the 1938 Royal Show, and samples and recipes of biscuits were exhibited by members. (Secretary, Mrs. C. M. Hudd.)

WARCOWIE.

Congress reports were received at the October meeting, and on 11th November, Mrs. W. Sanders spoke on "Preserving Fruit and Vegetables," and Mrs. H. Ward gave hints on Christmas cooking. (Secretary, Mrs. A. Crossman.)

WEPOWIE.

On the occasion of the Annual Field Day and Crop Inspection, organised by the Men's Branch and held at Mr. T. F. Orrock's farm on 3rd November, the members of the Women's Branch provided afternoon tea. (Secretary, Miss E. Roocke.)

WILKAWATT.

Nineteen members and 7 visitors attended the November meeting, which was held at Mrs. Pritchard's homestead.

Appetising Summer Dishes.

Members supplied the following recipes:—

Beetroot Mould.—Two average sized beets, 1 small lettuce, 2 dstspns. gelatine, 1½ cups hot water, ½ cup vinegar, pepper, salt, and sugar to taste. Cook beetroot until tender, peel, and cut 1 into slices. Line a mould with slices, then fill centre with small dice-shaped pieces of the remaining beetroot. Dissolve gelatine in hot water to which add ½ cup of vinegar, pepper, salt, and sugar. Pour over beetroot and allow to set. Garnish with shredded lettuce. Serve with mayonnaise dressing.

Salmon Jelly.—One small tin salmon, 2 dspns. gelatine, 2 cups hot water, juice of 1 lemon or tbspn. vinegar, 1 hard boiled egg, pepper and salt. Take the tin of salmon and open into a basin, break it up finely with a fork, then dissolve gelatine in hot water, adding the juice of 1 lemon, also pepper and salt, mix all thoroughly together. Wet a round cake tin or mould, and place slices of hard boiled egg at the bottom, then pour mixture in very gently, and allow to set. Garnish with shredded lettuce, slices of tomato and lemon. Serve with vinegar.

Veal Brawn.—One cup stock, 1 dspn. gelatine, 1 knuckle veal, pepper and salt. Put a knuckle of veal in a saucepan and cover with water. Add salt to taste and boil until tender. Take off fire and take the best pieces of meat off the bones, and place in layers in mould or basin. Sprinkle each layer with salt, pepper, and spice. Strain off about 1 cup of the liquid (hot), add to this 1 dspn. of gelatine. Stir into the remainder, then pour over the veal and put aside to set. When cold turn on to dish and serve.

Sheep Tongue Shape.—Three sheep tongues, pepper and salt, 1 pint of stock, 2 dspns. gelatine. Boil tongues until tender, skin and slice finely. Arrange in round cake tin. Fill tin with slices, then dissolve gelatine in clear hot stock, add pepper and salt, pour over tongues and allow to set. Turn out and garnish with shredded lettuce, sliced tomato and parsley.

Mint Jelly.—Two dspns. gelatine, 1½ cups water, 1 tspn. mint, 1½ozs. sugar, ½ cup vinegar, pinch of salt. Warm water and add gelatine; when dissolved allow to cool. Chop mint finely, add sugar, vinegar, and salt. Stir gelatine until nearly set, to prevent mint sinking. Pour into a flat mould and leave to set. Turn out, cut in fancy shapes, and serve cold with lamb in place of mint sauce.

Oriental Sundae.—Two cups hot water, 3 dspns. sugar, 2 dspns. gelatine, juice of 2 lemons, sponge cake, 3 bananas, 3 passion fruits, cochineal. Dissolve gelatine in hot water. Add sugar, lemon juice, and cochineal. Place in shallow dish, cut sponge cake into squares, pour in jelly, then cut bananas into rings and put on top of cake, and passion fruits on top of bananas. Allow to set and remain in dish. Serve with cream or custard.

Passion Fruit Filling and Sponge.—One tbspn. gelatine, ½ cup each water and strained passion fruit, 1 cup sugar, 1 sponge cake. Soak gelatine in water for 5 minutes. Add sugar and dissolve over fire, add passion fruit and bring almost to boiling point. Pour into a sandwich tin the same size as the sponge sandwich. Slightly warm the tin and jelly will slip out easily. When set, place between the layers of sponge cake and serve.

Lemon Sponge.—Two dspns. gelatine, 1 pint water, ¾lb. sugar, juice of 5 lemons, whites of 3 eggs. Put gelatine into saucepan with water, sugar, rind of 2 lemons, and juice of 5. Boil the whole for 10 to 15 minutes, strain, and let stand until it is cold, and begins to thicken. Beat in white of eggs, whisk briskly until it is quite white, then put into a mould which has been dipped in water and let it remain until perfectly cold (sufficient to fill a quart mould).

Chocolate Blanc Mange.—Two cups milk, 2 dspns. sugar, 2 tspns. chocolate or 1 tbspn. cocoa, 2 dspns. gelatine, vanilla to taste. Mix chocolate or cocoa with a little hot milk, place remaining milk in saucepan on fire, add sugar, chocolate (cocoa), and vanilla. Stir until all is thoroughly dissolved, and remove from fire. Dissolve gelatine in a little hot water and when cool stir into the milk, &c. Pour into a wet mould and place aside to set.

Angels' Food.—One pint fresh milk, ½ cup sugar, 2 eggs, essence of lemon, 3 dspns. gelatine. Place the well beaten yolk of eggs, milk, sugar, and lemon in saucepan. Let all first come to the boil, remove from fire and allow to cool, then stir in gelatine that has been dissolved in a little hot water. When nearly cold, stir in stiffly beaten whites of eggs, and put in a mould to set. Turn on to glass dish and serve with vanilla custard or stewed fruit.

Duncan Pudding.—¾ cup sugar, 1½ tbspns. cornflour mixed with the juice of a large lemon. In saucepan put 2 cups of boiling water and stir above mixture in. Bring to boil and stir in the whites of 2 eggs. Then set in a mould. With the 2 yolks and a little custard powder make a custard to serve with it.

Lemon Sago.—One cup sago, 1½ cups sugar, 2 lemons, rind and juice, 4 cups water, 2 tbspns. golden syrup, ½ tspn. essence of lemon. Put sugar, sago, and golden syrup to soak in water for 1 hour. Add grated rind, then put on to boil until thick and clear. Add juice of lemons. Stand 4 hours. Turn out and serve with cream. Can be coloured if desired.

Apricot Snow.—One tin apricots, 2 egg whites, pinch salt, ¾ cup cream, 3 tbspns. each cornflour, cold water, and sugar, 1 tbspn. gelatine. Mix cornflour to a paste with cold water. Drain syrup from apricots, and stir into cornflour paste. Bring to boil, stirring constantly, over slow heat, until cornflour is cooked. Add apricots to cornflour, keeping back a few apricots to garnish top of dish. Beat egg whites until stiff. Add the pinch of salt. Fold into apricot mixture; then stir in the cream. Put into dish, or glasses, and garnish with left-over apricots, and whipped cream or jelly.

Orange Snow.—To be served with fruit and cream. Four medium sized oranges, 3 egg whites, 3 tbspns. sugar, 1 lemon, 1½ cups water, 2 dspns. gelatine. Place gelatine and water in saucepan on fire; stir until dissolved. Add sugar, juice of oranges and lemon (or a small piece citric acid). Allow to cool, then add beaten egg whites, beat well until it looks like snow. Pile on dish and decorate with coloured jelly.

Salad Dressing.—One egg, 2 tbspns. each sugar and vinegar, 6 tbspns. milk, 1 tspn. each mustard and butter. Beat egg, add sugar, vinegar, milk, mustard, and butter. Put all on the fire and stir all the time, and as soon as the mixture comes to boiling point and thickens, remove from fire at once.

Macaroni Chicken.—Cook a chicken until flesh will come off bones easily. Have ready about ½lb. of macaroni boiled until tender in plenty of salt water. Put a layer of macaroni in bottom of greased pie dish, then a layer of chicken, and lastly the remainder of macaroni. Put a few dabs of butter on top and bake about ½ hour in fairly hot oven. Serve cold with salad.

Plum Sauce.—6lbs. diamond plums, 2ozs. salt, 3 pints vinegar, 6 cups sugar, 1oz. whole ginger, 1½ ozs. cloves, 1 tspn. cayenne pepper, ½oz. white pepper, boil 3 hours, then strain and bottle.

Lemon Pudding.—Cream, 1 cup sugar, 1 tbspn. butter. Add 2 tbspns. plain flour, 1 cup milk, beaten yolk of 2 eggs. Just before pouring into pie dish, fold in stiffly beaten white of 2 eggs. Add juice of lemon or orange to taste. Place in dish of water and bake in moderate oven until set.

Canadian Apple Pie.—Beat 2 eggs, 2 tbspns. melted butter, 1 cup each sugar and seeded raisins, grated rind, and juice ½ lemon, 2 cups grated apple. Bake in a moderate oven until nicely done; then spread stiffly beaten white of egg on top and brown slightly.

Try Parsnips this Way.—Boil until done, but not soft. Strain, dip in egg, then in brown bread crumbs, fry in nice hot dripping; can be served as a vegetable or alone as a luncheon dish.

A Farm House Savoury.—Take 1½lbs. of ham, mince lean and fat together. Boil a large slice of bread in ½ pint of milk, beat it and the ham well together, then add a well beaten egg, put in a pie dish, and bake a nice brown.

Gooseberry Jam.—3lbs. green goosberries, 1 quart water. Boil ½ hour, then add 5lbs. sugar. Bring to the boil for 5 or 10 minutes. (Secretary, Mrs. A. Oram.)

WILLOWIE.

Reports of the Annual Congress were given by Mesdames Bartlett and Foulis (Secretary), at the meetings held on 5th October and 2nd November.

WILMINGTON.

Thirty members and 9 visitors attended the meeting held on 3rd November, when a paper "Christmas Gifts" was read by Mrs. H. Noll. The competition for the best article made from a sugar bag was won by Mrs. Cole (Secretary). For the best sponge cake made by members who had not previously won a prize, the entry of Mrs. Christophersen was awarded first place.

WIRRABARA.

The meeting of 2nd October, was held at the residence of Mrs. C. Curnow, and was attended by 39 members and a large number of visitors including 30 members from the Gladstone Branch. Mr. Morgan, of Laura, addressed the November meeting which was attended by 40 members and 12 visitors, and on 16th December, members met at Mrs. Schnieder's homestead. (Secretary, Mrs. E. Harding.)

YANDIAH.

Congress reports were given by Mrs. Jettner and Miss R. Keller on 15th. On 12th November, members were entertained by Mrs. C. Jettner at her residence. (Secretary, Miss V. Keller.)

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All communications to be addressed:
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A. P. BLESING, *Minister of Agriculture*

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Agricultural Bureau Conferences, 1938

Murray Plains, at Cambrai, 6th April (Mr. H. F. Stevens).
South-East (Lower), at Robe, 13th April (F. H. Banks, Robe).
River Murray, at Berri, 16th June (Mr. E. J. R. Johnson).

Each Conference will commence at 10.30 a.m. Papers and questions for the agenda of any Conference should be submitted about a fortnight before the date on which it will be held.

Overseas Wheat Quotations

By courtesy of the New South Wales Marketing Bureau, the South Australian Department of Agriculture is supplied regularly with statements showing overseas quotations for wheat to the nearest eighth of a penny. The accompanying table gives weekly quotations in the State or country of origin of the wheat, and months of shipment or delivery.

Values Elsewhere than in Sydney are Expressed in English Currency.

Date of Quotation.	S. Aus. Wheat.	W. Aus. Wheat.	Manitoba No. 3 Wheat, ex Vancouver.	Argentine Wheat.	Karachi Choice White Wheat.	American Hard Winter Wheat, ex Gulf Coast.	White North Pacific Wheat.	Russian.	
	Mar.	April.	Mar.	Feb.-Mar.	May-June.	Feb.-Mar.	Mar.-April.	Feb.-Mar.	
1938.	*s.* *d.*	*s.* *d.*	*s.* *d.*	*s.* *d.*	*s.* *d.*	*s.* *d.*	*s.* *d.*	*s.* *d.*	
Feb. 17...	4 7½	4 7½	5 6⅝	5 4¾	4 5⅝	5 0¾	4 5½	4 10⅛	
Feb. 24...	4 6⅜	4 7¼	5 7½	5 4¾	4 5¼	5 0¾	4 6⅝	—	New South Wales, 8,800 tons (March) at 4s. 7⅛d.; Victoria 8,800 tons (afloat) at 4s. 7⅞d.; Russia, 5,200 tons (February-March) at 4s. 11⅜d.
			May.	Mar.-April.		Mar.-April.		Mar.	
Mar. 3 ...	4 6¾	4 7	5 6¾	5 4¼	4 4⅛	5 0	4 6¾	4 9	New South Wales, 7,700 tons (March) at 4s. 3d.
		April.	May.						
Mar. 10 ..	4 6	4 6¾	5 3⅝	5 1⅞	4 2¼	4 8⅝	4 4½	4 8⅝	Victoria, 8,000 tons (March) at 4s. 2¼d.

THE JOURNAL
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Progressive Centennial Development of the Pastoral and Agricultural Industries of South Australia, 1836—1936

[By Arthur J. Perkins, O.B.E., Life Member of the Advisory Board of Agriculture and of the Agricultural Bureau, Chairman of the Governing Council of the Roseworthy Agricultural College, sometime Director of Agriculture (1914-1936), Principal Roseworthy Agricultural College (1904-1914), &c.]

(*Continued from page 633.*)

THE FIRST DECADE, 1836-1846.

CHAPTER XII.

The Fourteenth Special Survey—The Sixteenth Special Survey—Report on Port Victoria and Port St. Vincent Special Surveys—The Murray River and Lake Alexandrina Special Surveys—The Seventeenth Special Survey—Correction of Mistake Having Reference to John Morphett's First River Murray Survey—The Eighteenth Special Survey—The Nineteenth Special Survey—The Twentyfourth Special Survey, Governor Gawler's Special Survey—The Twentysixth Special Survey—McLaren Refuses a Share in Eyre's River Murray Survey—The Thirtieth Special Survey—The Twentyfifth Special Survey—The Twentyseventh Special Survey—The Twentyeighth Special Survey—McLaren Exceeds His Buying Instructions—Discontent of South Australian Company's Shareholders—The Twentyninth Special Survey—Petition from its Proprietors to Governor Requesting Early Survey of Their Land—The Thirtyfirst Special Survey—The Thirtysecond Special Survey.

The Fourteenth Special Survey—No. 5 on accompanying Maps Nos. 1 and 2—was claimed by David McLaren for the South Australian Company on the 3rd May, 1839: 4,000 acres for £4,000 to be selected from a "compact district including the *Sources of the Torrens*"—by which name it subsequently became known—"and extending generally to the northward from the northern boundary of the South Australian Company's Special Survey on the *Sources of the Angas*" (Onkaparinga).(1)

Rectangular in shape, and seven by three and a half miles, this Survey included within its boundaries the townships of Forreston, Gumeracha, and Kenton Valley. Captain Sturt, at the time Surveyor-General, professed great admiration for this fine tract of country, describing it as exceedingly beautiful, endowed with the richest of soils, an abundance of running water, lovely sheltered valleys, &c.: he even suggested that the Company could with advantage to itself pay into the Treasury an additional £11,000, and take up the whole of the 15,000 acres, and save Sturt "the trouble of marking off any portion of it."(2) No doubt: and a handsome saving to Government would have ensued!

The Sixteenth Special Survey was taken up on the 10th May, 1839, on the recommendation of Robert Cock,(3) in the names of John Barton Hack and John Russell, but on behalf of "the Special Survey Association in town."(4) It was described as being 4,000 acres at £4,000 to be selected from "15,000 acres situated between *Union Point*—on the Harbour named Port Victoria, at or near Point Pearce, on the western side of Spencer's Gulf—on the west; and *Goold's River*—as laid down in Flinders' Chart—on the east; including, if necessary, such portions of either, as well as of the adjacent islands, as may be comprehended within a compact figure of 15,000 acres."(5)

"After a third visit to these valuable districts," wrote Robert Cock to the Proprietors of the Port Victoria and Port Saint Vincent Special Surveys about three months after they had been claimed, "I am gratified to inform you that I am increasingly satisfied with the value and local advantages of the same. By order of the Committee, four men, with provisions for one month, were taken over to cut a road and to sink wells. Two or three wells have been dug, and good water found at about six feet; at Victoria three springs of water have been discovered within the proposed site of the principal town. The wells have been put down there. At Port Saint Vincent the party of men is making good progress with cutting the road to Yorke Valley, and Mr. Hughes"—the surveyor—"is expected in Adelaide about a week hence"—say 13th August—"with soundings of the ports, and in a few days after will be ready with plans of the town and district."(6)

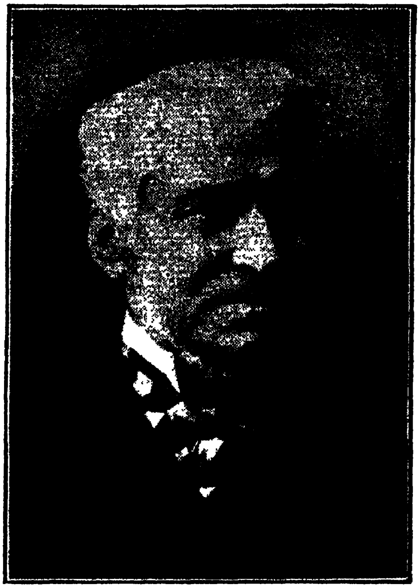
"The Special Survey claimed by Messrs. Hack and Russell," wrote McLaren, "is on the eastern side of Spencer's Gulf at Point Pearce, a few miles to the northward of that part of Hardwicke Bay where I landed on the 27th March. It has been chosen on the recommendation of Mr. Cock as being a harbour equal to, if not superior to, Port Lincoln; surrounded by good country, at about the latitude of Port Adelaide."(7) Later on, however, McLaren, in an attempt to impress his London Directors with the particular wisdom of his own land choices on their behalf, asserted that the Special Survey at Port Victoria, in common with many others, had proved "quite a failure."(8)

The Seventeenth Special Survey brought us down to the far-famed River Murray: and although somewhat in disregard of strict chronological order, it

(1) *South Australian Gazette and Colonial Register*, 4th May, 1839, page 1, col. 2.
(2) David McLaren to Edmund J. Wheeler, 8th July, 1839.
(3) See Appendix XVIII., Robert Cock's Report on the Port Victoria District.
(4) David McLaren to Edmund J. Wheeler, 11th May, 1839.
(5) *South Australian Gazette and Colonial Register*, 18th May, 1839, page 1, col. 2.
(6) *The Southern Australian*, 7th August, 1839, page 3, col. 5.
(7) David McLaren to Edmund J. Wheeler, 11th May, 1839.
(8) David McLaren to Edmund J. Wheeler, 8th August, 1840.

was proposed to group together all the Special Surveys that were claimed round about it and its outlet Lake Alexandrina, namely:—

The Seventeenth Special Survey—No. 17 on accompanying Maps Nos. 1 and 2—was claimed by John Morphett on the 13th May, 1839; 4,000 acres at £4,000 to be selected from "a compact district of 15,000 acres, extending one mile from each bank of the River Murray, and down to the waters thereof, running up stream from a point supposed to be that at which the Murray joins Lake Alexandrina, and bearing by compass south-east and by east, or thereabouts, from Mount Barker."(9)



John Morphett (1809-1892), Land Agent, Pastoralist, and Leading Politician.
(By courtesy of Archives.)

A glance at the accompanying Maps would show that these 15,000 acres extended from about two miles south of Wellington to about two miles north of Tailem Bend, including therefore within their boundaries Wellington, Wellington East, the great Jervois Swamp and Tailem Bend. But how John Morphett managed to persuade the Resident Commissioner that this snaky track —*twelve miles by two*—was a "*compact district*" within the meaning of the Regulations, passed all understanding—although of course he had an exemplar in the art in the person of George Milner Stephen, the first to bestride a river for twelve consecutive miles. The obvious intent in the present instance was to monopolise, as much as possible, the water frontage on either bank of the river, coupled with the equally valuable reclaimable swamp areas, leaving to future land-seekers sandy heights and stony plains!

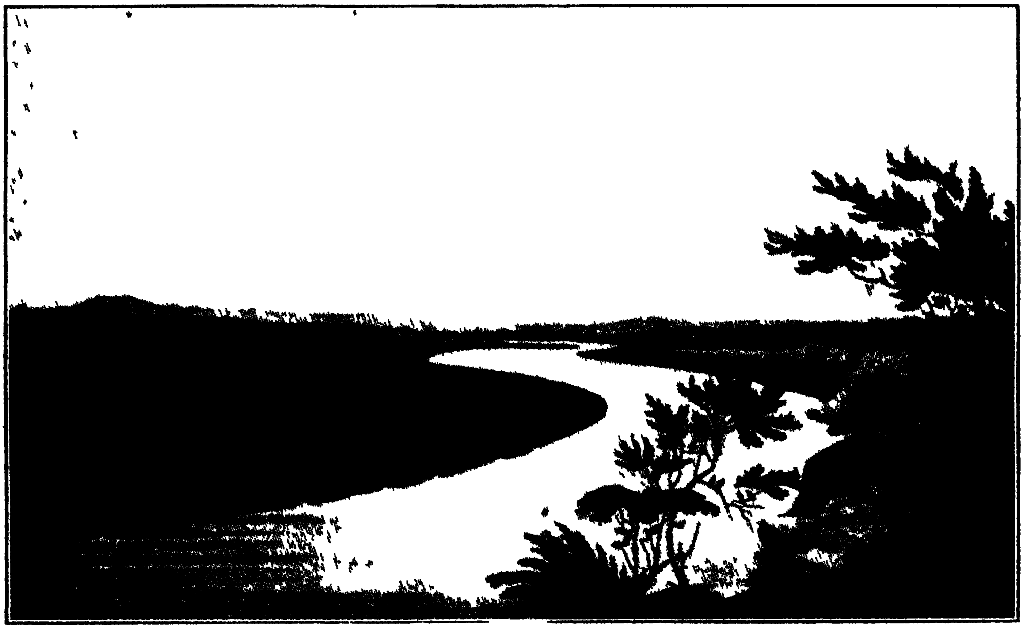
Later on—on the 20th July, 1839—John Morphett decided to increase the area of this survey by 500 acres, for which, of course, £500 had to be paid.(10)

This Survey—known subsequently as the *Wellington Special Survey*—had been specially selected by John Morphett for the "Secondary Towns' Association" of England, in the belief that a town of major importance was certain to spring up in the vicinity of the spot where the waters of the Murray found their way into Lake Alexandrina: the Murray was at the time visualised as the natural and inevitable outlet for the future produce and productions of central, and to some extent of eastern Australia. And it was anticipations of this kind that led to the early foundation of the township of Wellington on the land purchased by Morphett for the English Association: but unfortunately these anticipations had not yet materialised. The Association in question consisted of sixtysix members, among whom one hundred shares, upon each of which £65 had been paid up, had been distributed. For every share in his possession, each proprietor was entitled to forty rural acres and five town acres. The largest shareholders were Abel Lewes Gower (six shares), William Glogg Gover (six shares), and Patrick Vans Agnew (four shares): all other members of the Association held one or two shares respectively. Their affairs were administered by a directorate of six, of which Lieutenant Colonel P. V. Agnew was Chairman.

(9) *South Australian Gazette and Colonial Register*, 18th May, 1839, page 1, col. 2.
(10) *South Australian Gazette*, 1st August, 1839, page 3.

The Eighteenth Special Survey—No. 18 on accompanying Maps Nos. 1 and 2—was also claimed by John Morphett on the 13th May, 1839, but on his behalf: being 4,000 acres for £4,000 to be selected from a compact "district of 15,000 acres, extending one mile from each bank of the River Murray, running up stream, and commencing at the termination of the former Survey claimed by Mr. Morphett on the same river."(11)

This equally serpentine Special Survey, abutting as it did upon the northern boundary of its immediate predecessor, was calculated to extend by another twelve miles the control of John Morphett and his associates over the lower reaches of the Murray River; from the neighbourhood of Tailem Bend to about two miles south of Murray Bridge, and including therefore Wood's Point, Wiltyerong, Monteith, and Swanport within the boundaries of the northern Survey.



Murray Swamps near Wellington.
Painting by G. French Angas.
[*From "Life and Letters of Sir John Morphett."*)

This particular Survey gave rise to a peculiar error in the 1915-16 Presidential Address to the Royal Geographical Society of Australasia (South Australian Branch),(12) which cannot very well be passed by here without correction, subject, of course, to ample justification for whatever correction might be suggested. The Annual Address of the President—Hon. John Lewis—purported to deal with "Our Early Pastoral Possessions and the Pioneers of Settlement in South Australia," and in the course of it much interesting information was conveyed, including among other things a documented list of the Special Surveys taken in the first decade: unfortunately several errors had crept into this list, and among them John Morphett's second survey on the Murray was concerned. The details given concerning this Survey, which occupied the eighteenth position on Lewis' list, were correct in so far as they went: but further down in the list, in the 26th position, appeared another Survey concerning which the following

(11) *South Australian Gazette and Colonial Register*, 18th May, 1839, page 1, col. 2.
(12) Royal Geographical Society of Australasia, volume XVII., pages 23-29 inclusively.

meagre details were given:—"22nd April, 1839—South Australian Company, 2,000 acres; Edward Stephens, 1,000 acres; David McLaren, 500 acres; John Morphett, 500 acres.—Special Survey on the Murray." (These data were accompanied by a footnote to the effect that the Survey in question was not shown on the accompanying Map).

There were several points to be noted in connection with the details supplied concerning this Survey. Firstly, the date given—22nd April, 1839—was exactly twentytwo days earlier than any other date of application for Special Surveys on the Murray of which we had either official or private records. Secondly, contrary to invariable custom in such cases, no details had been given as to the location of the Survey, except that it was a "Special Survey on the Murray": but the Murray was amongst the longest rivers of the world. Thirdly, the details as to proprietorship in the several portions of the Special Survey were such as were never given in notices of other Special Surveys. It was therefore suggested that John Lewis' Twentysixth Special Survey was purely imaginary; but that apart from the date—that was quite unaccountable—the other details given by him could be connected with another Special Survey; with John Morphett's second survey, in fact; with our eighteenth as the data that followed would in our opinion show.

"Previously to Mr. Morphett's going out"—*i.e.*, setting out in search of suitable localities for Special Surveys—wrote David McLaren, "I applied to him on behalf of the Company"—*i.e.*, the South Australian Company—but "having been specially engaged for the Company formed in London to secure sites for Secondary Towns—he could not give us first choice: but on his return he made a proposal to give our Company the half of the Second Special Survey which he recommends highly—situated on the banks of the Murray—on terms mentioned by him in a letter to me of the 13th instant"(13)—*i.e.*, May—"which I immediately accepted from the great confidence I have in Mr. Morphett's judgment and honour. . . . The proposal of giving me personally an interest was altogether unexpected and unsolicited and by me unthought of. The allotment to Mr. Edward Stephens was, I believe, equally so."(13) And again: "The property of the" South Australian "Company on the banks of the Murray (2,000 acres) to the northward of the Special Survey taken by Mr. Morphett for the" London "Secondary Towns' Association immediately northward of Lake Alexandrina" is "known by the locality. . . . The latter is better adapted for a secondary town than ours:" but "to this I do not attach much importance!"(14)

From the above two extracts it would seem probable that John Lewis' data as to the proprietorship of portions of a Special Survey on the Murray had reference to a Survey claimed by John Morphett on the 13th May, but the crucial test was the *numbers* of the sections allotted to the four proprietors: these numbers had persisted to the present time(15) and prove conclusively and definitely that our Eighteenth Special Survey—Morphett's Special Survey that extended originally from the north of Tailem Bend to the south of Murray Bridge—was the Survey from which 2,000 acres were purchased by the South Australian Company, 1,000 acres by Edward Stephens and 500 acres by David McLaren.

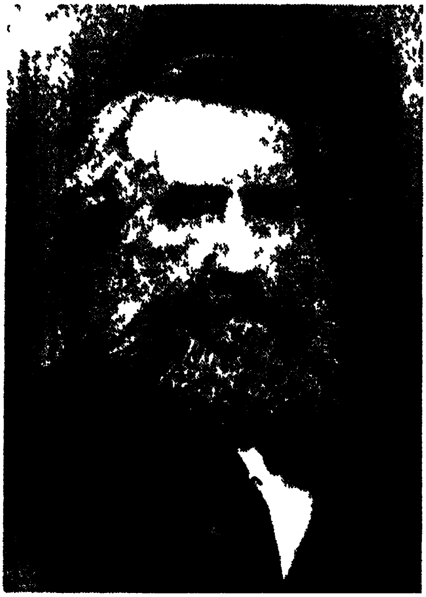
(13) For correspondence on the subject see Appendix XIX.

(14) David McLaren to Edmund J. Wheeler, 11th May, 1839. It will be noted that whilst McLaren's letter from which the extract in the text had been taken, was dated "*11th May, 1839,*" he actually discussed in that letter events of later dates—13th May, for instance—but this was readily understandable when one took into consideration the great irregularity of overseas mails in those days, which accounted for the inordinate length of some of their business letters, obviously written at several days' interval, without necessarily indicating any change of date from day to day.

(15) See Appendix XX., Allocation of Sections on Morphett's Northern Special Survey in the Murray.

The Nineteenth Special Survey—No. 13 of accompanying Maps Nos. 1 and 2—was claimed on the 15th May, 1839, by George Hall and William Mein officiating as representatives of several newcomers from Great Britain by the *Fairfield* which reached South Australian waters on 20th April, 1839: 4,000 acres for £4,000, comprising "a compact district of 15,000 acres on the margin of Lake Alexandrina, running generally in a west and north-west direction, on both sides of the spot where the River Angas disgorges itself, and on the banks of that river."(16)

Hence it would appear that this Special Survey had been claimed within a fortnight of the arrival of those emigrant farmers—a feat of expedition hardly to be looked for from a band of inexperienced newcomers: nor could it have been satisfactorily achieved, but for the expert advice and intimate knowledge of local conditions of Robert Cock, under whose guidance, we are told, they had placed themselves.(17) The latter's reputation as an agricultural adviser had been making steady progress for some time past: nor, fortunately for our emigrants could it be said that the Angas Survey was one of his failures: but the surrender a year later of the Port Vincent Special Survey—however unjustifiable in the light of subsequent experience—must have given a rude set-back to the reputation of its discoverer and commender. Cock's influence on the Survey under consideration was doubtless manifest in the orthodoxy of its outlines, which in every respect conformed to the accepted "river" type. Although officially described as a "compact district . . . on the margin of Lake Alexandrina," it eventually developed into a narrow parallelogram—two miles by twelve—with one of its shorter sides resting on the Lake, and its length sprawling inland and closely hugging the River Angas on either bank. The only town of consequence within its bounds was Strathalbyn, which was situated about two miles south of its northern boundary line: Milang, on the other hand, itself on the margin of the Lake, stood about a mile and a half beyond the westerly boundary line of Survey. Among the chief of the original landed Proprietors there were several whose descendants had continued to guide the interests of the district to this day. We may mention in passing, Dr. John Rankine—806 acres; John Gemmel 487 acres; Donald McLean 410 acres; Nicol Alexander Mein 486 acres; William Mein 242 acres; William Rankine 166 acres; Edward and Charles Stirling 81 acres, &c. David McLaren stated that he had "interested a friend in Glasgow—Duncan Grant—to the extent of 400 acres" in that Survey—but as the name of the latter did not appear in the list of original Proprietors: and at a later date McLaren reported that he had sold Grant's land in the Finniss Survey for 35s. per acre, we must conclude that whilst he might originally have intended to purchase land in the Nineteenth Special Survey, he had been unable to do so, and had therefore invested Grant's money in the Survey of the "*Mouth of the Finniss.*"(18)



Dr. John Rankine (1801-1864), Pastoralist and Farmer.
(*Courtesy Archives.*)

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(16) *South Australian Gazette and Colonial Register*, 18th May, 1839, page 1, col. 2.
(17) David McLaren to Edmund J. Wheeler, 11th May, 1839.
(18) David McLaren to Edmund J. Wheeler, 11th May, 1839.

The Twentyfourth Special Survey—No. 20 on accompanying Maps Nos. 1 and 2—was taken by George Hall, Private Secretary to Governor Gawler, on the 23rd May, 1839; 4,000 acres for £4,000 to be taken from "a compact district of 15,000 acres on the River Murray, twelve miles in length, commencing about two miles to the southward of the *Great South Bend*"—now known as the *North-West Bend*—"and following down the stream, including both banks thereof when required."(19)

To the foregoing description the following official note was subsequently added: "Extended in January, 1840, to the northward, so as to include the Flat immediately to the northward and eastward of the *Great South Bend*, so much land being relinquished from the southern extremity of the Survey as will continue to limit the general area to the regulated dimensions."(20)

The Survey in question, which conforming to river traditions, was long and narrow, started about two miles south of Morgan, and extended thence twelve miles down stream, passing on the way down Murbko Flat and terminating within a mile of Wood's Flat. "The Survey taken by His Excellency" wrote David McLaren, "in the name of George Hall, Private Secretary, is said by Mr. Morphett—if there was no mistake in pointing out the place —to be of very little value."(21) If due account were taken of the amount of land still available in the Province at the time, of quality superior to that of Morgan and its vicinity, the conclusion could not be avoided that no mistake had been made "in pointing out the place" to John Morphett.

The Twentysixth Special Survey—No. 19 of accompanying Maps Nos. 1 and 2—was claimed by Edward John Eyre and Osmond Gilles on the 10th July, 1839: 4,000 acres for £4,000, taken from "a compact figure of 15,000 acres on the western side of the River Murray, situated between the parallels 30° 16′ and 30° 32′ south latitude; and following the course of the river, to commence from a point south of the first-mentioned parallel to be fixed upon by Mr. Eyre, and to have a water frontage of twelve miles, if required, to the River Murray."(22)

Although the Proprietors of this Survey seemed to have started off with a public-spirited intention of leaving the eastern bank of the river to later claimants, the subsequent pressure of custom was apparently too great for them, as eventually the *Twentysixth Special Survey* developed into nothing more than a southerly extension of the Survey of George Hall—or was it the Survey of Governor Gawler?—proceeding down stream to the vicinity of Blanchetown. The Survey had been claimed shortly after Eyre's return from an unsuccessful northern expedition, during the course of which unfavourable droughty conditions, almost complete deficiency of both water and grass, had eventually driven him back in an easterly direction, until he made contact with the Murray River at latitude 34° 16′; which point it will be observed, he subsequently made the northerly starting point of his River Murray Special Survey.(23)

Prior to Eyre's departure upon what eventually turned out to be an unsuccessful northerly expedition, David McLaren, always on the lookout for cheap bargains for his Company, succeeded in entangling Eyre—a more or less simple-minded, direct type of man—in one of his unfair, one-sided contracts of which he made boast to his London correspondent: "Mr. Eyre who lately came a second time overland with cattle from New South Wales, has set out on an exploring expedition for a Special Survey" and "contemplates being out two months. I have arranged with him, that after he has made choice of one Survey for himself, I shall—in preference to all other parties—be furnished with all the information he can give, in order that *I may decide on taking one or two Surveys;* and in the event of my making a purchase I shall pay him 5 per cent. on the amount;(24) but he is *no pay* unless I make a purchase."(25) For such purposes the usual commission in those days was 10 per cent.: G. F. Angas—a stickler for the proprieties in such things—did not consider unreasonable such a charge when claimed by Charles Flaxman, provided that the latter were acting as an agent, and not as a participant in the purchase. McLaren himself, had accepted by return of post John Morphett's offer to allow the South Australian Company to take up one half of his River Murray Special Survey, provided that the Company agreed to pay him 10 per cent. on the purchase money. But when persons—or parties as they would have been called in those days—were specially commissioned to carry out certain tasks, involving on their part heavy out-of-pocket expenditure, it was not at all customary to render due payment subject to the erratic caprice of opposite parties to the bargain: and particularly not, when refusal to honour such a contract and to accept results derived from it, was not based upon any defects in the results themselves, or in the manner of securing them. Hence, apart altogether from the one-sidedness of the bargain, McLaren's final decision in the matter can be described as none other than shabby. "Mr. Eyre has returned," he wrote: "he has described eight places, in each of which he thinks a Special Survey might be advantageously taken besides one which he has reserved as a first choice for himself. He has, however, proposed to give me for the Company one-half of that first choice. I have not fully determined as to taking it; but beyond 2,000 acres I will not go"(26)—there was no mention of 2,000 acres in the contract, or of any less area than a full Special Survey, or 4,000 acres.(27) And later: "I declined taking any interest in Mr. Eyre's proposed Survey, because *although I have great confidence in his judgment, I was averse to draw on you on that account.*"(28) Then why put the poor

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(19) *South Australian Gazette and Colonial Register*, 25th May, 1839, page 1, col. 1.
(20) South Australian Archives, Ms. Notes *re* Special Surveys.
(21) David McLaren to Edmund J. Wheeler, 20th November, 1839.
(22) *South Australian Gazette*, 11th July, 1839, page 5, column 3.
(23) *South Australian Gazette*, 11th July, 1839, page 3, column 1.

Distribution of Flour at Moorunde.
[*From "South Australia" (Francis Dutton*), 1846.

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(24) For full terms of the Contract see Appendix XX. at the back of volume.
(25) David McLaren to Edmund J. Wheeler, 3rd May, 1839.
(26) David McLaren to Edmund J. Wheeler, 2nd July, 1839.
(27) See Appendix XXI. at back of volume.
(28) David McLaren to Edmund J. Wheeler, 8th July, 1839.

man to the trouble and expense of collecting data, examining localities and drawing up reports, when McLaren must have known from the outset, that whatever the results brought back to him, he would feel obliged to decline them: surely Eyre would in future be very wary of engagements with David McLaren! Fortunately for him, however, Eyre was able to find a more accommodating partner in Osmond Gilles, former Colonial Treasurer and able man of business. This Survey was generally known subsequently by the name of "Moorundie."

The Thirtieth Special Survey—No. 16 on the accompanying Maps Nos. 1 and 2—4,000 acres for £4,000. "A compact district at the eastern extremity of Lake Alexandrina, bounded on the north by the spit running nearly east and west into the Lake, and on the west into the Lake itself, descending to south and south-east about four miles."(29)

Claimed by Neil Malcolm on 30th August, 1839.

The Thirtyfirst Special Survey, situated on the Murray, was inserted here although the actual date when application was made for it could not at present be given. It received the name of "*The Thirtynine Sections Special Survey*": on the eastern side of the river this Survey was enclosed within a very pronounced loop of the Murray, now known as the "Neeta Irrigation Area"; and on the western side extended into the Hundred of Finniss. It comprised 3,322 acres only. of which the major portion on the western banks was owned by Osmond Gilles; and the major portion on the eastern banks by William Leigh: other minor proprietors were Robert Cock, W. Ferguson, Edward John Eyre, &c. This area of land was surveyed in February, 1840.

It was known that William Leigh who came to Australia from Staffordshire, had purchased 4,000 acres' worth of land prior to his departure from England: and for reasons that cannot now be ascertained, John Lewis in his Presidential Address to the Geographical Society allotted to Leigh 4,000 acres, located vaguely and incongruously somewhere between "Skillygolie Creek and country between the Lower Wakefield and Hutt Rivers and the Sources of the Para"!

This Survey could be taken as terminating the list of Surveys claimed on the River Murray and Lake Alexandrina. From this point the remaining Surveys of the Province will be given in ordinary chronological order.

The Twentyfifth Special Survey—No. 12 on accompanying Maps Nos. 1 and 2—was claimed by John Morphett on the 8th July, 1839: 4,000 acres for £4,000 to be selected from "15,000 acres in that district of country extending generally to the south-east of the Survey called 'The Three Brothers' taken by J. B. Hack and to the eastward of the eastern boundary of 'The Meadows Survey'."(30) Eventually, the "Green Hills Special Survey"—to give it the name by which it ultimately became known—was hemmed in by other Special Surveys on all its boundaries, with the exception of the southerly one, which at its western extremity almost made contact with Bull's Creek. On the northern boundary was the Three Brothers Survey, on the western boundary the Meadows Survey; and on the eastern boundary George Davenport's Survey.

In the allocation of the Land Grants in connection with this Survey thirteen sections or 994 acres were allotted to Colonel Patrick Vans Agnew; and fortytwo sections, or 3,006 acres, to John Morphett, making a total of 4,000 acres.(31)

The Twentyseventh Special Survey—No. 21 of the accompanying Maps Nos. 1 and 2—had already been briefly noted in the matter of common boundary lines with the *Seven Flaxman Surveys.* It was claimed by Edward Rowlands and Joseph Gilbert on the 17th July, 1839: 4,000 acres for £4,000 to be selected from "15,000 acres commencing at the northern boundary of the South Australian

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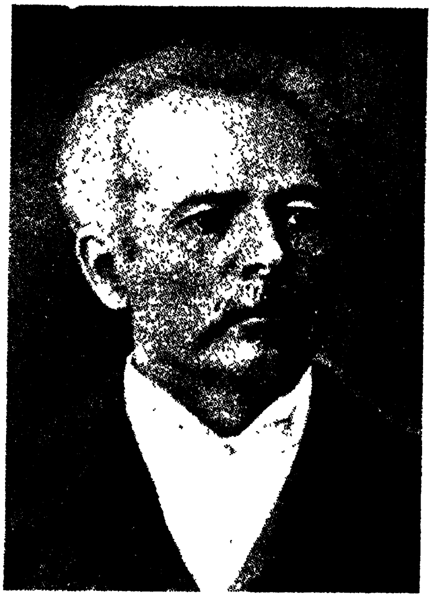
(29) From Ms. List of Surveys in South Australian Archives.

(30) *South Australian Gazette*, 11th July, 1839, page 5, col. 3.

(31) Minutes of meeting for consideration of applications for land, 1838-44, page 200, in South Australian Archives.

Company's Special Survey of Lyndoch Vale; and extending to the northward and eastward in the direction of the Special Surveys taken by Mr. Flaxman on the 26th April last.''(32)

To all intents and purposes this Special Survey was almost completely encircled by the Flaxman and Lyndoch Vale Surveys, three miles only of the northern end of its western boundary being free of them. Tanunda and Tanunda Creek came within its boundaries. Although the hilly portions of the Survey had in the main been taken up for pastoral purposes, much of its plains and valleys and gentle acclivities had been planted with vines and fruit trees: and whilst the chief claim to distinction of the district was probably its close proximity to the Seppeltsfield Wineries and Vineyards—with which it was hoped the memory of the progressive spirit of Benno Seppelt would always be associated—yet it should not be forgotten that it was from the Pewsey Vale vineyards that had come light wines—both red and white—of the highest quality yet produced in South Australia.



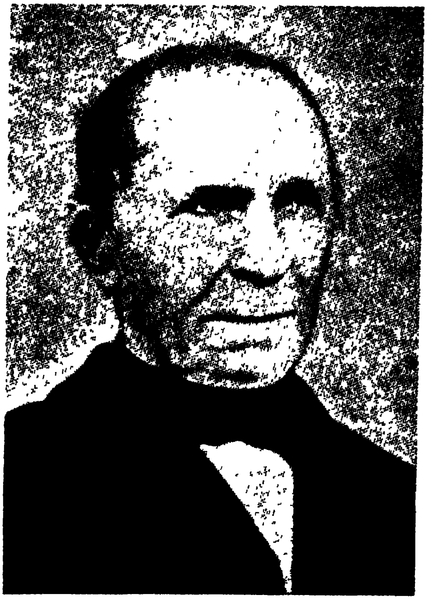
Benno Seppelt (1846-1931), of Seppeltsfield, Prominent Vinegrower.

The Twentyeighth Special Survey—No. 3 of the accompanying Maps Nos. 1 and 2—claimed by the South Australian Company on the 20th July, 1839: 4,000 acres for £4,000 to be selected from ''15,000 acres lying generally to the westward of the western boundary of the South Australian Company's Special Survey denominated 'The Sources of the Torrens,' and including the station now occupied by Mr. Bonney, as well as the *Streams and Tributaries of the River Torrens,*''(33) by which name it came to be known.

In taking this new Special Survey McLaren was well aware that he was exceeding his instructions in the matter of land purchases: but like Charles Flaxman, the fever was upon him, and he was obsessed with the idea that it was the prime right and mission of the South Australian Company to own all the best land in the Province: not to farm and cultivate it, but progressively to lease it, or to sell it at considerably enhanced prices, to those who were willing to cultivate it: but unlike Flaxman he had no grandiose dreams of rising on parallel lines to wealth corresponding to that of his employers: hence he would appear to have been less open to criticism for his unauthorised proceedings. ''Having exceeded my powers a little,'' he had already written towards the end of June, ''in that—beside Lyndoch Valley chosen in virtue of thirty preliminary land orders—I have taken three and a half Special Surveys''—he had been authorised to purchase three or four, but no more—''I do not consider that I ought to do much more.''(34) The position of the London Directors was, however, comprehensible enough: naturally they had no preconceived objections to purchasing land at £1 per acre and selling it subsequently at £5 and £10 per acre, and at considerably more, when urban land was in question: the purchase of the site of the New Port at 12s. per acre and the sale of some acres a few months later at £1,500 per acre was an exceptional illustration of this kind of transaction. But experience had shown, what reflection might have foreseen, that the number of

(32) *South Australian Gazette,* 18th July, 1839, page 7, col. 1.
(33) *South Australian Gazette,* 1st August, 1839, page 3.
(34) David McLaren to Edmund J. Wheeler, 27th June, 1839.

persons able to purchase land at high prices was exceedingly limited: and that the indiscriminate purchase of land by the Company not only led to undesirable immobilisation of its own capital, but tended to check general development, which alone could give enhanced value to the Company's lands. And in the meantime the Directors had to meet disgruntled shareholders who were alarmed at the heavy capital investments of the Company and the relative insignificance of the returns therefrom. It was in vain that the Directors endeavoured to argue that the existing position was perfectly normal from the standpoint of a new Colony; that capital outlay had to be incurred over the pioneering years; that roads had to be built; bridges erected; seaports established; &c., &c.; but that adequate returns were bound to follow in due course; that the Company was gradually accumulating assets in South Australia which must soon prove revenue-producing. But the shareholders were obdurate and all argument was to no purpose: nothing would satisfy them short of a steady inflow of interest and outflow of dividends, proportionate to the capital expenditure of the preceding three or four years. Hence for some time past McLaren's ears had been dinned with "*strict economy*" letters from London, insisting upon the all but impossible task of immediately curtailing expenditure to a bare minimum and increasing revenue very considerably: but on no account was any further capital expenditure to be incurred: to all of which he made suave replies from the safety of 12,000 miles in distance and 12 months in time: "Reducing expenditure and thereby saving interest and further calls on the shareholders is a measure I wish much to effect."(35) And this presumably was his real excuse for declining Eyre's offer of half a Special Survey on the Murray, after having led the latter to believe that he—McLaren—would willingly take up one or more Special Surveys, if only Eyre could recommend suitable sites for the purpose. On the other hand, in spite of warnings from his London Directors, he did not hesitate on the 18th July, 1839, to pay £2,000 into the Colonial Treasury, in order to secure 1,000 additional acres in each of the Company's Special Surveys, known respectively as *The Sources of the Torrens* and *The Sources of the Onkaparinga*: and to cap all, on the 20th of the same month he had hazarded the purchase of a new Special Survey—*The Streams and Tributaries of the Torrens,* for which, of course, £4,000 had to be paid! After a brief description of his most recent acquisition on behalf of the Company, the purchase of which, McLaren frankly recognised had not been sanctioned by the Board, he proceeded to state that "Should the Board think it proper to withhold its confirmation of the purchase . . . I should trouble you to send the enclosed letters to my son John, at Messrs. G. F. Angas & Co., and I doubt not the amount—£4,000—will be paid to you with any charges thereon, by the time the money requires to be paid by you to the" Colonization "Commissioners. Had I the means of paying for it



John Warren (1783-1873), Farmer and Grazier, one of the original proprietors of the "Mouth of the Finniss" Survey.

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(35) David McLaren to Edmund J. Wheeler, 27th June, 1839.

in the event of the Board declining it, I should consider my fortune made for life."(36) But apart from a little perfunctory grumbling the London Board of Directors showed no signs of boggling at such a gift!

The Twentyninth Special Survey—No. 14 on accompanying Maps Nos. 1 and 2—was claimed by Robert Cock, on behalf of himself and others, on the 22nd August, 1839: 4,000 acres for £4,000 to be selected from "a Special Survey of not less than 15,000 acres in and about a river designated Currency Creek, situated about ten miles in a northward direction from Encounter Bay. The Survey to commence at that point of the river where it turns acutely to the north, and to extend downstream, but not to infringe on the district reserved for Preliminary Purchasers."(37) On the Ms. records of the Special Surveys in the South Australian Archives there was a note dated 9th October, 1839, to the effect that the designation of this Special Survey had been altered to the "*Mouth of the Finniss*": and obviously the "river" in and about which the Survey was stated to have been located was not "Currency Creek," but the "Finniss," which emptied itself into Lake Alexandrina.

"We have this week to announce that another Special Survey of 15,000 acres has been taken, in the name of Mr. Robert Cock, land agent, but of which Mr. John Warren and Mr. W. Ferguson, and several of our best practical agriculturists are holders of large portions. The locality of this Survey is on Currency Creek, near the outlet of the Murray from the Lake, one of the very best tracts in the Encounter Bay district, and only ten miles distant from that important station."(38)

The energetic character of many of the Proprietors of this Survey was forcibly illustrated in a petition which they presented to the Governor, not quite eight weeks after claiming their Special Survey—*i.e.*, on the 14th October, 1839. They drew the Governor's attention to the Province's "*extreme*" need of agricultural operations, and to the fact that many of them were "really and truly practical farmers," who had made their purchases of land "with a view to its *immediate and bona fide location and culture*": that they were anxious to meet the Province's requirements in that direction, but were unable to do so because of the "unsurveyed" state of their properties: and accordingly they earnestly entreated His Excellency to give orders for the immediate Survey of their lands. The petition was signed by J. Warren; C. Hare; H. Giles; A. Birrell; Cock and Ferguson; and William Malcolm.

The Governor's reply was both appreciative and sympathetic: and in view of the circumstances brought under his notice by the petitioners he agreed without hesitation to break the rule of priority of survey according to dates of registration, and to give direction that the survey of their district could be "proceeded with, with the least possible delay."(39)

The Thirtysecond Special Survey curiously enough escaped both "Gazetting" and mention in the public press, notwithstanding the fact that the Editor of the

(36) David McLaren to Edmund J. Wheeler, 23rd July, 1839.

(37) *South Australian Gazette*, 29th August, 1839, page 1, col. 3.

(38) *The South Australian Register*, 24th August, 1839, page 3, col. 4. John Lewis in his Presidential Address to the Royal Geographical Society had referred in error the whole of this quotation from the *Register* to the Thirtythird Special Survey, to which reference will be made later on. The latter was a survey taken up by an English Syndicate and not registered until December, 1839: and in the circumstances the *Register* paragraph of the 24th August, 1839, could not possibly refer to it, apart altogether from the fact that it indicated that most of the Proprietors were local men.

(39) *South Australian Register*, 2nd November, 1839, page 5, col. 2.

Register—George Stevenson—a highly vocal person, was one of its chief promoters. It was claimed on the 24th November, 1839, (40) by George Stevenson and others and named the "*Barossa Special Survey*": 4,000 acres for £4,000. No descriptive note of it could be found, but from a Map in the Survey Offices, it could be said to have been a genuine "compact" figure lying immediately to the south of the South Australian Company's Lyndoch Valley Special Survey; and that the South Para River traversed its centre from east to west.

On the 8th December, 1841, George Stevenson, as Agent of the Proprietors of this Survey, selected the sections on their behalf. The following were the chief Proprietors:—John Warren, 880 acres; George Stevenson, 734 acres; Thomas Auld, and the Trustees of Shand, 495 acres; William Giles, 410 acres; Malcolm, 409 acres; Josiah Partridge, 243 acres; and Miller, 160 acres. (41)

The Thirtythird Special Survey—No. 15 of accompanying Maps Nos. 1 and 2—was claimed by Robert Wright in December, 1839, on behalf of the Currency Creek Association—of London—comprising Hananel de Castro, Frederick Friend, Benjamin Charles Thomas Gray, George Lungley, and John Robert Thomson: 4,960 acres paid for in England by peculiar Land Order dated 3rd May, 1839. (42) The Survey was said to comprise Currency Creek and its neighbourhood: it had about two miles of water frontage facing Hindmarsh Island and eventually included the townships of Currency Creek and Goolwa. A footnote in the Ms. notes concerning Special Surveys in the South Australian Archives stated that although the Survey had been claimed in December, 1839, it had not been entered for some time after owing to the fact that the line of demarcation separating land reserved for Preliminary Land Orders had not at the time been definitely fixed. On 1st July, 1840, Robert Wright, acting as Agent for the Proprietors, was able to select the surveyed sections on their behalf. (43)

(*To be continued.*)

APPENDIX XVIII.

REPORT OF INFORMATION OBTAINED BY ROBERT COCK AGREEABLY TO INSTRUCTIONS DELIVERED TO HIM BY THE COMMITTEE OF THE ADELAIDE SURVEY ASSOCIATION. (1)

VICTORIA HARBOUR.

This safe and capacious harbour is situated on the west side of Yorke's Peninsula, at that place named by Captain Flinders *Point Pearce*. It certainly combines the greatest extent of fertile country (especially for agricultural purposes) yet discovered in South Australia.

That district of country which lays between Troubridge Hill and the harbour is about forty miles in length and from eight to fourteen miles in breadth. The soil is composed of decomposed limestone, and is generally rich and fertile, and, I am satisfied, would raise heavy wheat crops. The timber is principally she-oak, but other timber is in abundance for fuel and fencing purposes, although not generally adapted for building operations; it is sufficiently open for the immediate commencement of agricultural pursuits.

The other portions of the district bear generally a light soil, and are covered with scrub; this is particularly so to the east and south-east of the harbour, distant from ten to fourteen miles.

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(40) Royal Geographical Society of Australasia, volume XVII., page 27.

(41) Minutes of Meetings for consideration of applications for land, 1838-44, page 217.

(42) John Lewis seemed to have mistaken this date for the date of application of the Survey.

(43) Minutes of Meetings for consideration of applications for land, 1838-44, page 126.

(1) *South Australian Gazette and Colonial Register*, 15th June, 1839, page 2, col. 2.

The district abounds in limestone, but it is seldom seen on the surface. The shores are in general low, and sand prevails for a short distance back. Fresh water is found almost everywhere at from six to ten feet from the surface. There appeared to be few natives—kangaroo, emu, and wallaby are plentiful.

Point Riley is about fortyfive miles to the northward. I travelled over this part for about twentyfive miles, and landed at several places on the coast, but found it much the same as on the south side of the harbour, although, perhaps, not of such a uniform quality. It is occasionally belted with scrub and grassy plains, and generally of a lighter soil; still, it is of a productive nature.

The country in the distance, to the north of Victoria Harbour—I mean that which lays between the head of Saint Vincent's Gulf and the southern bend of the Murray—is as contiguous to Victoria Harbour as to Port Adelaide; and this part of the Province, so far as it has yet been explored, has proved to be land of a superior description.

The entire country that this splendid harbour commands, and of which it is the natural, and in fact only port, embraces an agricultural district of at least six hundred square miles, the whole of which is within a distance of seventy miles of the port in a direct line. The country is what is called tableland, and the ground even where it is light or scrubby, is firm for carriages.

The harbour of this place will be a great public benefit, being in the centre of such a fertile country, affording the means of import and export, and facilitating the location of the country. This, in connection with the other survey taken by the Association, named Port Saint Vincent, on the eastern side of the Peninsula, forms an important connection and shortens the distance to Swan River by three hundred miles.

Robert Cock.

APPENDIX XIX.

CORRESPONDENCE IN *RE* OFFER OF JOHN MORPHETT OF PORTION OF SPECIAL SURVEY ON THE RIVER MURRAY TO THE SOUTH AUSTRALIAN COMPANY.

John Morphett to David McLaren.

13th May, 1839.

I beg to inform you that I have discovered a portion of the Province hitherto unexplored which I consider well worthy of a Special Survey; and have much pleasure in tendering you for the South Australian Company one-half of it, provided you feel inclined to give me on account of that body a commission of 10 per cent. upon the purchase money.

The remaining half of the Survey I propose to divide between some friends and myself, and shall be happy to hold five hundred acres at your disposal at par.

I have taken a survey this morning for some gentlemen in England whom I represent, and in the event of my receiving a reply to the present agreeing to my proposal, I shall be obliged by the payment on behalf of the Company of their proportion of the purchase money, that I may at once hand in my claim to His Excellency the Resident Commissioner.

David McLaren to John Morphett.

13th May, 1839.

In reply to your esteemed favour of this date, offering me on behalf of the South Australian Company one-half of a Special Survey in a portion of the Province hitherto unexplored, and which you consider well worthy of a Special

Survey, I have much pleasure in accepting the offer on the conditions stated, and have given orders for the immediate payment of that proportion of the purchase money.

I feel gratified that my object in behalf of the South Australian Company in making application to you last week for an interest in a Special Survey with you, in the event of your finding out a country worthy of it, has been so promptly attained; and I beg leave to tender you my warmest thanks for your unexpected kindness in giving me personally an interest in that Survey.

APPENDIX XX.

ALLOCATION OF SECTIONS ON MORPHETT'S SOUTHERN SPECIAL SURVEY ON THE RIVER MURRAY.(¹)

22nd April, 1842.

The following selections were this day made in a Special Survey on the River Murray (John Morphett's Northern Survey) :—

John Morphett.—Section 1086 and part of Section 1087, aggregating 500 acres.

W. Giles for South Australian Company.—Section 1088, 362 acres; Section 1087, 145 acres; Section 1096, 297 acres; Section 1097, 195 acres; Section 1084, 193 acres; Section 1085, 307 acres; Section 1094, 132 acres; Section 1095, 369 acres: in the aggregate 2,000 acres.

Edward Stephens.—Section 1083, 240 acres; Section 1089, 176 acres; Section 1090, 324 acres; and part of Section 1082, 260 acres: aggregating 1,000 acres.

David McLaren.—Section 1093, 400 acres; and part of Section 1091, 100 acres: aggregating 500 acres.

APPENDIX XXI.

LETTER OF AGREEMENT BETWEEN DAVID McLAREN AND EDWARD J. EYRE IN *RE* DISCOVERY OF SPECIAL SURVEY BY THE LATTER.

David McLaren to Edward J. Eyre.

25th April, 1839.

In the prospect of your going into the interior of the country to examine the land, &c., for the purpose of claiming a Special Survey of 4,000 acres for yourself, I hereby propose to pay you on your return £200, being 5 per cent. on the cost of such a Survey, on the following conditions, namely, that you shall immediately on your return furnish me, as Manager of the South Australian Company with a description in writing of any place, and of all places in which you may in the best of your judgment, think it would be for the interest of any person to claim a Special Survey; provided always that you give me what additional information you can which I may require, and that such information and description be given to me in preference to all other parties; so that I may have the first choice after you have made choice of one Special Survey for yourself; and provided that on account of such information I shall declare for a Special Survey, it being understood and mutually agreed that you shall give me the information the day after you return; and that in such a form as will enable me, in the event of deciding to claim a Special Survey to secure it from his Excellency the Commissioner, and that on the day after I have received such information from you I shall decide whether I shall claim such a Special Survey or not.

(¹) Minutes of meeting for consideration of applications for land, 1838-44, page 234.

Superphosphate—The Turning Point in our Agriculture. Still Essential for Profitable Crops. The Heavier the Application, the Greater the Profit

[By W. J. SPAFFORD, Director of Agriculture.]

Just when crop growing in South Australia receded to the position of becoming definitely unprofitable, it was discovered that a shortage of phosphorus in the soil was the main cause of the poor crops that were being produced, and from experiments conducted by Professor J. D. Custance, the Professor of Agriculture and first Principal of Roseworthy Agricultural College, it was shown that the best manner of making good this shortage of phosphorus was by applying superphosphate to the crops. Following on this discovery it was soon found that relatively light dressings of superphosphate brought wheatgrowing back to a profitable business, and this proved to be the turning point in South Australian agriculture.

Superphosphate for Crops.

Professor W. Lowrie concentrated his powerful driving force on the education of farmers in the adoption and use of superphosphate in their crop growing activities and to such purpose that in a very short period of years applications of superphosphate to all annual crops became general throughout the length and breadth of the country. The adoption of the practice of applying superphosphate to crops as a matter of course was rendered easier because the soils were really fertile in all crop requirements except phosphorus, and very light dressings of superphosphate gave such marvellous increases with the crops that farmers were not involved in very expensive outlays for manures while testing out the new practice.

Renewal of Faith in the Country.

The return of crop growing to profit-earning by applications of superphosphate led to a renewal of faith in the country, and was an incentive to farmers to improve their farms and to endeavour to make progress, and from that time onwards improvements in all agricultural practices have continued to be made. The intelligent improvement of soil working practices led to the liberation of such large amounts of mineral plant food other than phosphorus because of the natural soil deficiency in this substance, that heavier dressings of superphosphate became necessary to utilise to the full the other soil constituents made available by cultivation. These heavier dressings meant still further increases in crop yields, but because of the differences in the crop-growing conditions of the various districts of the State, it was quite impossible to lay down hard and fast rules as to the ideal dressing of superphosphate for all localities, and so it was necessary to conduct experimental plots to discover this factor for each separate set of conditions.

Increased Yields Follow Heavier Dressings.

Professor A. J. Perkins tackled this problem in a comprehensive manner at Roseworthy Agricultural College, and at a later date had manurial experimental plots conducted in over 20 wheatgrowing districts of the State, and the results secured show very clearly that as the period during which a particular block of land was farmed increased, so it was necessary to increase the dressing of superphosphate, and further that up to a point the increased dressings meant increased crops and increased profits.

The field experiments referred to were conducted in localities with average annual rainfalls varying from 10in. to over 18in., and without exception showed that where ½cwt. of superphosphate per acre was used, it gave a very large increase over unmanured crops; that where 1cwt. of superphosphate per acre was applied, a substantial increase followed in each case; where 1½cwts. were used there was a further profitable increase, but not always so in low rainfall districts, and that where 2cwts. were applied a further useful increase was secured only in the better wheatgrowing districts. For the whole of the experimental plots undertaken over a period of years, the application of ½cwt. of superphosphate per acre gave an average increased yield with wheat of 4bush. per acre over and above that secured from unmanured crops. The addition of another ½cwt. per acre gave an average increase of 1½bush. per acre for the first ½cwt., and the addition of a further 1cwt. (making 2cwts. per acre) gave an average increase of 1½bush. per acre over and above a dressing of 1cwt. superphosphate per acre.

Superphosphate for Pastures.

The increased yields following the use of superphosphate on annual crops, although great, is not so enormous as are the increases secured from the use of this fertiliser on pasture land, and more particularly on sown pastures. Not only is the livestock carrying capacity of pastures tremendously increased when adequately fertilised with superphosphate, but phosphate of lime is so very important for the normal health of all animals that the making good a shortage of this material leads to improved health as well.

At Kybybolite Experiment Station where very extensive field experimental work with pastures has been conducted for a long time, and where detailed and accurate records have been kept, very striking results have been shown for the heavier dressings of superphosphate. In a series of manurial experiments on sown pastures consisting of a mixture of subterranean clover and wimmera rye grass, the records of the eight-year period ending 1936 showed that such a pasture unmanured carried on the average 1.05 sheep per acre per year. When it received a dressing of 45lbs. of superphosphate (45 per cent.) per acre per year, the grazing was increased to 3.36 sheep per acre per year. A dressing of 90lbs. of superphosphate (45 per cent.) raised the carrying capacity to 4.74 sheep per acre per year, and an annual dressing of 180lbs. superphosphate (45 per cent.) led to a further increase to 5.35 sheep per acre per year.

All-Australian Export Baconer and Porker Competitions.

Entry forms in connection with the second series of these competitions are required to be lodged with works managements on or before the 15th April next, and entries should be forwarded to works in time for them to be treated and shipped so as to arrive in London for judging on 15th July.

Pig producers are reminded that such competitions provide important publicity for Australian pigmeats in the United Kingdom, and that the reports of the judges on individual entries are a valuable index to the producers concerned of their achievement, and a guide to the type required in the United Kingdom market.

Each entry should comprise three pig carcasses, including heads, bred and fattened by the entrant. Only one entry of each particular breed or cross will be allowed from each entrant. The sire of the entry must be pure bred, and from a litter recorded by the Australian Stud Pigbreeders' Society. Weights for baconer carcasses should be not less than 120lbs. nor more than 160lbs. dressed and including heads. Weights for porker carcasses should be not less than 60lbs. nor more than 90lbs. dressed and including heads. Prize money totalling £25 is awarded by the Board to successful entrants, and in addition a trophy valued at £10 10s. is competed for. No entry fee is charged. Entry forms are obtainable from the usual trade channels, also on application to the Veterinary Officers of the Department of Commerce, Port Adelaide, and from the office of the Board at 419, Collins Street, Melbourne.

Coast Disease

[By R. H. F. Macindoe, M.R.C.V.S. (Deputy Chief Inspector of Stock) and E. W. L. Lines, B.Sc. (Senior Research Officer, C.S.I.R.).]

This statement has been prepared to assist sheep owners in determining what is the most likely cause of the disease they may have occasion to report. If the treatments recommended below are not successful, owners are asked to advise the Stock and Brands Department.

Certain diseases exhibit to the average sheep owner somewhat similar symptoms, and these diseases are discussed below:—

Coast Disease.

"Coast Disease" is a name given to a disease in which the main symptoms are:—

Slow wasting, pale skin, lack of appetite, and a progressive weakness, whereby affected sheep are unable to travel for any distance.

As the name implies, this disease is restricted to some coastal areas for a distance of up to 20 miles from the seaboard. A characteristic feature of such country is that the soil is of limestone sand (generally wind-blown shell grit from old beaches). Lime sand fizzes and froths when treated with vinegar or spirits of salts; ordinary quartz sand, as seen inland in the Mallee districts, &c., does not.

On "coasty" country adult sheep will do well for a time (up to three months), and then, in spite of a good growth of feed, fail to hold their condition. They recover quickly when moved on to sound country; wormy sheep, however, do not. Sheep on "coasty" country often suffer from worms as well.

Lambs dropped from ewes grazing in such coastal areas fail to thrive, and many die within a few weeks of birth.

Worm Infestation.

Infestation with worms is often confused with "Coast Disease," as affected sheep (and lambs) become low in condition and anaemic. They usually have a diarrhoea. However, sheep suffering from worms usually retain their appetite, and travel well until they get very poor.

Ataxia, or "Rickets."

Ataxia, commonly called "Rickets," is a disease of lambs, which starts between birth and weaning.

When affected lambs are made to move there is a noticeable swaying of the hindquarters, later they knuckle over on the fetlocks, and if still driven will go down and cannot rise until rested. The complaint becomes progressively worse, lambs will not suckle, they lose condition, and die.

Both Coast Disease and Ataxia have been under investigation for a number of years; promising results have been obtained by supplying sheep in the coastal zone with licks containing cobalt and copper salts.

Prevention of Coast Disease.

For the prevention of "Coast Disease" the following lick should be tried:—

Take—

	Lbs.
Ferrous sulphate crystals	40
Manganese sulphate	5
Zinc sulphate	2
Copper sulphate	2
Cobalt sulphate	1

Grind together to powder.

Add 2lbs. to every 100lbs, of common salt, mixing thoroughly.

If there is a number of affected sheep, a drench of the lick (minus the common salt) may be administered, dissolving 8ozs. of the lick with 2 fluid ozs. of spirits of salts in 1gall. of water, the dose being 2 fluid ozs. twice a month, as well as offering the lick.

Caution.—Phosphates should not be mixed with this lick.

Prevention of Ataxia.

For the prevention of Ataxia a treatment which has been used with success in Western Australia is the provision of a lick composed of common salt 100lbs., copper sulphate ½lb. The lick is prepared by dissolving the copper sulphate (bluestone) in a quart of boiling water and sprinkling it on the common salt and mixing thoroughly, and placing out in troughs.

This is given to the ewes three months before lambing, and continued until weaning.

Affected lambs may be given copper sulphate as a drench, *i.e.*, dissolve ½lb. of copper sulphate in boiling water and make the solution up to 2½galls. Dose:—1 teaspoonful once a day for 10 days.

Note.—Copper sulphate will not cure the damage that has already occurred in the spinal cord, but may prevent further lambs developing the disease. Giving the copper sulphate to the pregnant ewes as a lick is the surest preventive.

Treatment for Worms.

The best method known at present to get rid of worms is to drench with bluestone (copper sulphate)-"Black Leaf 40" solution.

Two different strengths of copper sulphate may be used, viz.:—

No. 1.—Bluestone solution 2 per cent. strength, *i.e.*, 1lb. dissolved in 5galls. of water in which is mixed "Black Leaf 40" solution (16 fluid ozs.).

Dosage:—Adult sheep, 2 fluid ozs. (4 tablespoonsful); two-tooths, 1½ fluid ozs. (3 tablespoonsful); lambs, 6-12 months old, 1 fluid oz. (2 tablespoonsful); lambs, 3-6 months old, ½ fluid oz. (1 tablespoonful).

No. 2.—Bluestone solution 5 per cent. strength, *i.e.*:—

Bluestone	1lb.
"Black Leaf 40"	16 fluid ozs.
Water	2galls.

Dosage:—Adult sheep, ¾ fluid oz. or 20 c.c's.; two-tooths, 4-6 fluid drams or 15-20 c.c's.; lambs, 4-15 months, 1½-4 fluid drams or 5-15 c.c's.; Lambs up to 4 months, 1½ fluid drams or 5 c.c's.

Note.—Doses of the 5 per cent. solution vary according to sizes and weight.

To Prepare Bluestone-"Black Leaf 40" *Solutions.*—Use only the bright blue crystals, discarding any that are white and powdery. Dissolve the crystals in a little boiling water and then add water to make 5galls. or 2galls., according to whichever formula you intend using. Then add the "Black Leaf 40" and stir well. As bluestone corrodes metals it should be prepared in earthenware, porcelain, or wooden vessels.

It is recommended that a graduated measure glass, up to 2 fluid ozs. be used as the size of spoons is liable to vary.

The main advantage in using a 5 per cent. solution is that the dose is smaller and therefore easier to administer:—1 fluid oz. of 5 per cent. solution contains approximately 23grs. copper sulphate; 1 fluid oz. of 5 per cent. solution contains approximately 23mms. "Black Leaf 40." 1 fluid oz. of 2 per cent. solution contains approximately 9½grs. copper sulphate; 1 fluid oz. of 2 per cent. solution contains approximately 9½mms. "Black Leaf 40."

Note.—It is not necessary to starve the sheep before drenching.

Move sheep to paddocks which have not been stocked for 3 weeks. However, sheep will not recover from worm infestation without good feed.

Weather Damage in Cereal Hay

[A. R. HICKINBOTHAM, Chemist, Roseworthy Agricultural College.]

In another article in this issue Mr. C. T. McKenna discusses the potential danger of feeding Mouldy Fodder to livestock.

There has been a good deal of discussion of the damage done to hay crops by the unseasonable weather early in December. It is obvious that the quality of chaff has been seriously affected throughout a large part of the State, but it does not necessarily follow that its feeding value has been materially reduced. At the suggestion of the Principal (Dr. A. R. Callaghan), an effort was made to assess the actual loss in nutriments suffered by hay that was in the paddock in stooks during this period.

The extent to which weather conditions at Roseworthy were abnormal during the first 14 days of December may be judged from the following meteorological data:—

	December, 1937.	Average of Previous 5 Years.
Total rainfall	1·66 in.	·41 in.
Average precipitation per day	12 points	3 points
Number of days rain fell	8	3·7
Percentage humidity at 9 a.m.	62	55
Percentage humidity at 3 p.m.	57	42
Average cloud (scale 0-10) 9 a.m.	6·7	4·8
Average cloud (scale 0-10) 3 p.m.	6·1	4·3
Average daily maximum temperature	77	80
Average daily minimum temperature	59	55

Apart from the wetter conditions generally, due to the greater amount of rainfall, it will be seen that the amount of cloud and the humidity were both greater than usual, while the average daily temperature range was less. All these factors favour the development of moulds and micro-organisms and the damage suffered by the hay, though partly due to leaching, is largely the result of the activity of such organisms under unusually favourable conditions.

The greatest loss during exposure to the weather is in the weight of the hay. The farm superintendent (Mr. A. L. Humphries), selected 25 practically undamaged sheaves from the centres and 25 corresponding damaged sheaves from the outside of stooks. These were hung up to dry uniformly and each sheaf weighed; the undamaged sheaves averaged 10.86lbs. each, while those damaged averaged 9.37lbs. each in weight. Thus the hay had lost 1.49lbs. per sheaf, corresponding to 13.7 per cent. of the original weight of the hay.

The material was then sampled for chemical analysis and the results were as follows:—

Comparative Analysis of Damaged and Undamaged Hay.

Constituent.	Not Exposed, Undamaged.	Damaged by Exposure.
	%	%
Moisture	4·48	4·94
Ash	5·55	5·77
Fat (petroleum extract)	1·07	1·28
Protein (N x 6·25)	8·58	9·22
Fibre	23·28	24·10
Carbohydrates (by difference)	57·04	54·69
	100·00	100·00

It will be noticed that the feeding value, judged from these figures, is only slightly decreased, the starch equivalent being slightly lower and the nutritive ratio actually higher in the weathered sample. Though a decrease in palatability might be expected, experience shows that the animals are eating the damaged hay quite readily.

The actual loss of each constituent is shown in the following Table in which the yield of each per acre, and the quantities remaining in the weathered samples, are calculated on the basis of a 2-ton crop, this being the average yield per acre from the paddock.

Yield of Fodder Constituents in Pounds Per Acre, and Net Loss Per Acre.

Constituent.	Not Exposed, Un-damaged.	Damaged by Exposure.	Loss Due to Weathering in Lbs. per Acre.
Yield	4,480	3,865	615
Dry matter	4,279	3,674	605
Ash	249	223	26
Fat	48	49	+1
Protein	384	356	28
Fibre	1,043	931	112
Carbohydrates ..	2,556	2,114	442

This Table discloses a very serious loss in the return per acre of all constituents except fat. An increase in fat content is a common experience in cases where micro-organisms have acted on the material; since they contain, as a rule, a high percentage of fat they must convert other constituents into fatty substances.

The loss of minerals is of importance since this falls on the more soluble constituents which are, in large part, those of greatest value to the animal. The loss of protein appears comparatively small, but some of this will almost certainly have been changed into less valuable forms. The most serious losses occur in the energy-yielding constituents, particularly the carbohydrates, for which the loss amounts to nearly 4cwts. per acre.

It is interesting to note that somewhat similar analyses of rain-damaged and normal samples of hay were done in this laboratory in 1921. The hay had been subjected to about 1in. of rain but no growth of moulds on the hay was recorded, and the weather records show that fine drying weather followed the rain. The analytical results are, however, very similar to those given above except that there was an actual loss in the percentage of protein in the damaged material, while the increase in fibre was more pronounced than in the samples from the recent harvest.

Mouldy Fodder

[By C. T. McKenna, B.V.Sc., M.R.C.V.S., Veterinary Officer, Stock and Brands Department.]

In the preceding article in this issue Mr. A. R. Hickinbotham discusses the actual loss in feeding value caused by the exposure of Cereal Hay to unseasonable weather.

Much of this season's hay crop in South Australia has, on account of the abnormal seasonal conditions which prevailed during haymaking time, been spoiled by mould invasion.

There are various moulds which can affect hay. Some types develop in the stooks whilst others make their appearance in the stacks. The fodder must be moist, and warmth is necessary before these moulds can grow on it. The warm humid weather which occurred at harvesting time provided ideal conditions for their multiplication on damp hay. Further, if such damp hay (or grain) is stored in stacks, heat is generated, and again conditions are suitable for mould growth.

These moulds are believed to decompose certain constituents of the fodder into substances which are often harmful to farm stock.

Mouldy or musty hay has an unpleasant smell and a dirty appearance. Badly affected samples are a dark-brown colour and give off clouds of dust (the spores of the mould) when shaken out.

Mouldy fodder is a potential danger to farm stock because it can, directly or indirectly, cause various and severe derangements. The commonest of these are:—

1. Botulism.

This disease, which is popularly known as Forage poisoning, when it results from feeding on infected fodder, is due to a poison known as toxin, which is manufactured by a germ—the *Bacillus botulinus*—when it grows on a suitable material.

Hay is one such material. This bacillus is found in cultivated ground, and it is easy for it to contaminate such fodder through dust. It will, however, only grow in the hay and produce its toxin when the conditions are suitable. These conditions are similar to those required for mould growth, and again the growing moulds themselves set up favourable surroundings in which the *Bacillus botulinus* can multiply.

Indirectly therefore, the feeding of mouldy fodder may give rise to Botulism, not because of the mouldy state of the foodstuff, but because the conditions which favour mould growth are also suitable for the *Bacillus botulinus* to increase and produce its toxin.

Botulism can follow the ingestion of fodder which does not appear in any way unwholesome and the feeding of mouldy forage does not necessarily cause Botulism. It has, however, been observed that outbreaks of Botulism are more common following those seasons which are favourable to mould growth on the hay.

2. Digestive Disturbances.

Indigestion, Diarrhoea and Bloating can follow ingestion of mouldy fodder. In the horse, the digestive upset usually takes the form of a severe attack of colic which is often fatal.

3. Defects of Respiration.

Such damaged chaff usually contains a lot of dust and this is apt in the case of horses to bring about such abnormalities in the breathing as those conditions commonly known as "Thick Wind" and "Broken Wind."

Care in Feeding Necessary.

Again the musty odour of mouldy feeds adversely affects the palatability of such fodder.

Horses are far more susceptible than cattle or sheep to the ill effects which may follow their feeding on such damaged foodstuffs. It is but rarely that sheep are affected. This variation in susceptibility between horses and cattle and sheep may be due in part to the fact that horses, especially those in work, consume relatively large quantities of hay (chaff). Again cattle and sheep get a greater variety of feed and are often fed on loose hay; both of these factors tend to minimise the dangers from mouldy feeds.

Whilst it is recognised that many farmers will be forced to feed such foodstuffs, and that in many cases this will be done without ill effects to their stock, it is necessary that they practice care in feeding such fodder.

The following suggestions may help the stockowner to do this:—

(1) Hay which has been badly damaged by mould should not be fed to farm stock.

(2) The opening up of damaged sheaves and the exposing of the mouldy hay to strong sunlight during dry weather checks the growth of the mould by drying out the fodder. This exposure should be continued until the mouldy smell disappears. Under good weather conditions, the hay should dry out thoroughly in two days.

Such treated hay, unless too badly damaged, could then be chaffed or preferably fed loose to stock. During chaffing operations as much dust as possible should be removed, and where sieves are fitted for this purpose, they should be kept in order. The same treatment should be given to mouldy grain.

(3) Where practicable, it is desirable to feed a mixture of good and damaged chaff (or grain) after the latter has been exposed to sunlight as suggested above.

The greater the percentage of good feed in the mixture the better. In the case of mouldy grain, it is advised that a mixture of one part of the damaged grain and nine parts of good grain be used. Such a mixture is recommended where musty wheat or barley has to be fed to pigs; or else the damaged grain could be cooked and fed to them after the water is drained off.

(4) A stack of mouldy grain should be opened up to allow free circulation of air. This dries out the feed and lowers the temperature. The mould is always worse towards the centre of the stack.

(5) The question of a suitable solution for pickling grain was discussed with Mr. T. T. Colquhoun, M.Sc., of the Waite Agricultural Research Institute. He recommended a solution of one part of Commercial Formalin to 250 or 300 parts of

water. The operation should be carried out in the same way as the wet pickling of seed wheat. The results would be similar to those obtained from exposure of the grain to sunlight.

(6) Avoid as far as possible, the feeding of mouldy fodders, especially chaff, to horses and valuable stock.

Treatment of Ailments.

The following notes on the treatment of the various ailments which may arise from the feeding of these damaged foodstuffs may be of value.

Botulism.

This disease, when it is caused by the ingestion of fodder containing the Botulinus toxin, usually only affects horses. Cattle and sheep rarely contract it in this manner.

Botulism in farm horses generally occurs during the summer months and the history usually is that several horses are affected at about the same time.

The symptoms are a paralysis of the limbs, and very often of the muscles associated with swallowing. In the former case the affected animal loses control of the movements of the limbs, and usually goes down and is unable to rise, whilst in the latter, he cannot swallow his feed or can only do so with difficulty, and the tongue usually protrudes from the mouth, and saliva drips from it. The animal is listless and rapidly becomes weak. The mortality is high.

Treatment is not satisfactory. The first thing to do is to sling the horse (but not the cow). It is then necessary to ascertain whether the patient can swallow or not. The best method of doing this is to offer a drench of water. If he can take this, the following medicines could be tried:—

(1) In the early stages of the disease, give a small teaspoonful of Condy's Crystals dissolved in a quart of water.

(2) Later give a drench of Raw Linseed Oil, 1 pint; Oil of Turpentine, 2ozs.

(3) Subsequently give a heaped teaspoonful of powdered Nux Vomica mixed with treacle each night and morning.

(4) The feeding of the suspected fodder should be discontinued, and the animal should be given what feed it will eat.

Colic in Horses.

As soon as symptoms are observed, the following drench suitable for a draught horse should be given:—

Raw Linseed Oil, 1½ pints.
Oil of Turpentine, 2ozs.
House Cloudy Ammonia, ½oz.

These ingredients should be shaken up thoroughly and the drench should be given carefully. This medicinal treatment should be supplemented with enemas of warm soapy water. To do this a length of hose ½in. or ¾in. in diameter and 6ft. long, with a funnel in one end, is required. The hand, washed and oiled, carefully carries the free end of the hose as far forward as possible into the passage, and 3 to 4 gallons of the solution is slowly introduced through the funnel. Repeat enema every three or four hours if necessary.

Bloat in Cattle.

The following drenches are suitable:—

No. 1—Turpentine, 2ozs.; Household Cloudy Ammonia, ½oz.; cold thin gruel, 2 pints.

No. 2—Condy's Crystals (small teaspoonful) dissolved in a quart of warm water.

Supplement medicinal treatment by gagging and light exercise. In severe cases, puncture the paunch on left side. Use a trocar and canula or a clean sharp pocket knife.

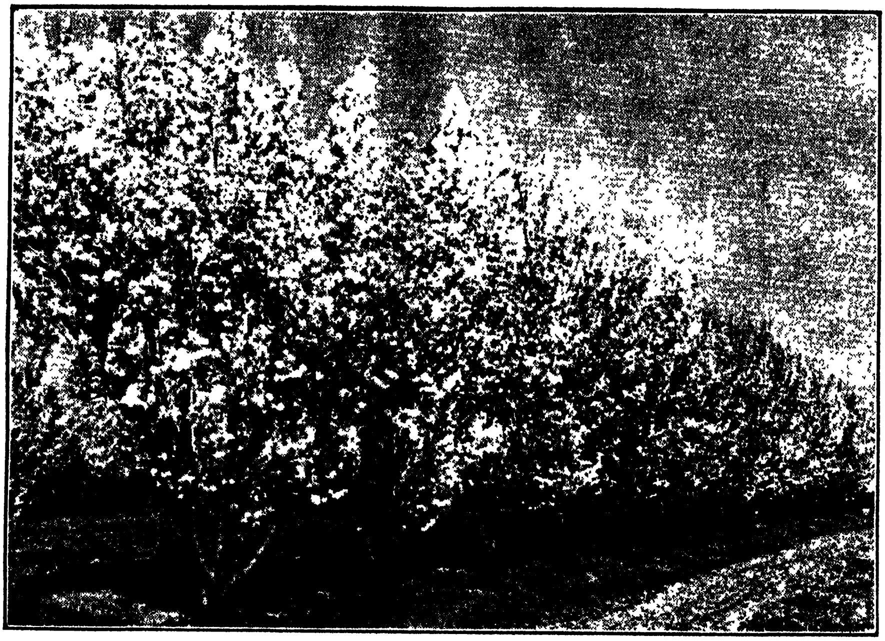
Diarrhoea in Horses and Cattle.

Commence treatment by giving a drench of:—

Raw Linseed Oil, 1 pint.
Oil of Turpentine, 2ozs.

After the effects of the drench have worn off, give Chlorodyne, 2ozs., dissolved in a pint of flour gruel.

Note.—All the above treatments should be supplemented by a change on to better feed.



Wireless Talks

Almond Culture in South Australia

An address broadcast through 5CK by R. Fowler, Manager, Blackwood Experiment Orchard.

The almond is reputed to be native to the countries in the Mediterranean regions which possess climatic conditions in many respects similar to those in South Australia. It is related to the peach which it resembles in habit of growth, character of blossom and leaves. The wood, however, is harder, and the almond will long outlive the peach under equally favourable conditions.

It is not definitely known when the almond was first introduced into South Australia, but it is on record that two varieties were growing in a garden in North Adelaide in 1842, and it is quite probable that almonds were planted on Kangaroo Island even as early as 1836. South Australia has been the principal almond-producing State of the Commonwealth for many years, and more recently "Blossom Time" has become one of our tourist attractions. The cultivation of the almond, however, is now receiving considerable attention both in Victoria and New South Wales, as well as in South Australia.

More interest has been shown in extending the almond plantations in recent years than in any other form of orchard production, and many inquiries are received by the Horticultural Branch concerning almond culture. This talk is therefore designed more for intending planters than for established growers. Nurserymen have had some difficulty at times in supplying the demand for almond trees, a fact which indicates that there has been a large increase in the area planted. This expansion is probably justified to some extent for approximately 370 tons of almonds, in the form of kernels, paste, and meal were imported into the Commonwealth in 1935-36, the value of which in Australian currency would be about £42,300.

However, it should be remembered that a large number of recently-planted trees have not yet reached the bearing stage; in South Australia the number of non-bearing trees is given as 71,930 or roughly 800 acres so that the peak in the upward trend of production has not yet been reached. Since 1925-26—or during the last decade—the importations of almonds in the shell and as kernels and paste have decreased considerably. Since 1932 practically no almonds in the shell have been imported, and kernels and paste, &c., have fallen from approximately 620 tons in 1925-26 to 370 tons in 1935-36.

While a conservative expansion may be desirable, it should only be on land particularly adapted to the production of this crop and in districts that possess favourable climatic conditions. In South Australia these localities appear to be situated only on the plains and lower foothill slopes of the ranges which extend from Cape Jervis northwards. Here the rainfall and soil conditions, assisted by the modifying influences of the sea air, favour the profitable production of varieties that have been proved suitable for these conditions. The ideal almond soil is a deep medium loam, uniform in texture, well drained, comparatively rich in lime and other mineral constituents which go to form plant foods. Almonds cannot profitably be grown in any district and in any type of soil. Yield is chiefly a matter of varieties, cultural methods, and favourable climatic location which includes proper moisture conditions and freedom from frost.

The rainfall necessary to maintain the trees and to enable them to bear regular crops depends on its annual distribution, the time and intensity of the rains, and the ability of the soil to receive and retain them. With an average rainfall of 16in.-18in. the almond will thrive fairly well, though some irrigation in the summer is then desirable. Where the rainfall exceeds 21in. other climatic disabilities frequently intervene, such as cold, wet and frosty weather in the early spring season when the trees are breaking into blossom and leaf. Continued rainy, damp weather at this time is apt to destroy the pollen and prevent the bees from working, and they are the principal agents in bringing about pollenisation. These factors are fatal to the production of profitable crops of almonds.

The almond is commonly looked upon as a very hardy tree that can be grown without any of the attention usually given to other orchard trees, and this false impression will probably lead to much disappointment and loss to many people who, with the idea of supplementing their income, have planted small areas of almond trees on unsuitable areas. While the almond may be in many respects an easy tree to grow it is rather particular in certain pollination, climatic, and soil requirements.

The almond industry in South Australia has gradually emerged from the depression of a few years ago, and is now more or less stabilised—due in a measure to the Almond Growers' Association—the organition responsible for the marketing of the major portion of the crop. Other responsible factors are decreased imports and a slightly increased consumption, and no doubt the unsettled conditions prevailing in the almond-producing countries—Spain and Italy—are also contributing factors in maintaining the present high prices. The time is opportune to sound a note of warning relative to the indiscriminate planting of large blocks of trees, for one cannot anticipate a continuance of the high prices that have ruled for almonds during the past few seasons.

Trade in almonds is now done chiefly with kernels to be used by confectionery manufacturers in the preparation of their products. The market for unshelled almonds is essentially a seasonal one and of short duration, the bulk of them being consumed during the holiday season. Manufacturing firms also use most of the imported materials, and the profitable expansion of the acreage under almonds depends to some extent on reducing or eliminating the imported article.

Unfortunately it would seem that the right type of kernel to compete with the imported Spanish kernel used in certain sections of the confectionery trade is not grown in Australia, and the variety which produces this kernel is not known. These kernels are bought to specifications both as regards size and count. They are not actually small for when laid on the flat they cover approximately the same area as the home-grown kernels of the same grade, but they are much thinner throughout, and consequently the counts per pound of comparable grades are much higher. No. 1, 426 as against 325, and No. 2, 550 against 425. Imported kernels are also carefully graded, are free from extraneous matter, and packed in 28lb. boxes for convenience of handling. The almond collection at Blackwood does not contain a variety comparable with the Spanish type, but inquiries have been instituted by the Horticultural Branch which it is hoped will lead to the identification and introduction of this variety.

Production Costs.

Definite figures are not available, but costs will vary considerably from orchard to orchard and from district to district. Most growers have their own tillage and harvest equipment, and cultivation costs will not be very high. Harvesting, cleaning, and cracking are probably the most expensive items. These costs will vary greatly according to the size of the crop and the method employed. A very comprehensive study undertaken by Officers of the University of California for the season 1925 showed an average yield of 418lbs. to the acre costing 11.5 cents, 5¾d. per lb. to produce, equal to 50 per cent. of the present market price for best varieties in the shell.

Yields.

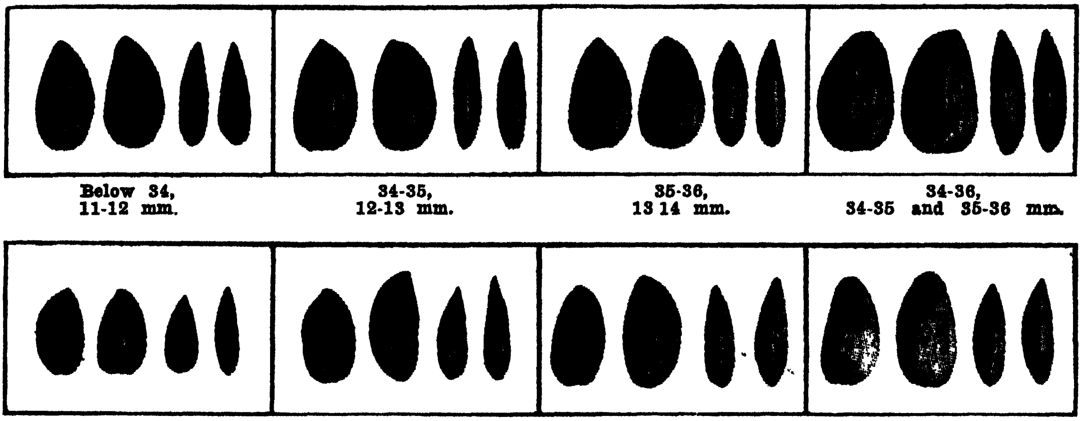
The yield of almonds in different years and in different orchards is probably more variable than that of any other of the common orchard fruits. While the fluctuations from year to year are largely due to climatic conditions the variations as between orchards are mainly attributable to the varieties grown, the care given the trees and the character of the soil and frost conditions. The almond is the first of the deciduous fruit trees to burst into leaf and blossom, and generally the last one to shed its leaves, so that the rest period is very short. Lack of moisture, shothole fungus, or the devitalising influences of red spiders may cause the trees to lose their leaves prematurely in which case the following crop of nuts may be seriously affected. Irrigation and spraying are needed to rectify this condition.

Almonds begin bearing at from 3-5 years, but it is not until the fifth year generally that they produce a crop that will pay to harvest—one that will cover costs of maintenance and harvesting. The crop should continue to increase in yield until the trees are 10 to 12 years old. They should continue to yield maximum crops for a number of years. Just at what age they start to decline is not known. The average production of almonds in California is between 700lbs. and 800lbs. per acre, and 1,000lbs. are considered a fair estimate for business purposes. The average yield in South Australia for the past 10 years has been about 400lbs. per acre, though in 1935-36 it was in the region of 700lbs. per acre from approximately 1,460 acres in bearing. Included in this acreage would be a large number of trees planted as breakwinds round boundary fences which in many instances receive little attention. It is interesting to note that there are approximately 28,000 fewer trees in bearing in South Australia than 10 years ago; however yields are much higher.

A small experimental plot of almonds, 60 trees, has been set out at the Fullarton Experiment Orchard. This plot, now 5 years old, contains 5 trees each of the 12 leading varieties and the trees are receiving the cultural treatment usually given to other orchard trees; that is to say, they are being pruned, sprayed, and cultivated. Data being collected includes flowering dates and crop records and later on it is hoped to include pollination research.

Propagation and Planting.

Almond trees are usually propagated by budding the required varieties on to suitable seedlings in the same manner as that usually employed for peach and other stone fruits. They can be grown from seed, but this is not recommended as they do not reproduce true to type. On the question of rootstocks there is still much to learn. This matter is receiving attention by the Horticultural Branch, and it is intended to utilise a portion of the Fullarton Orchard for a small but comprehensive series of almond stock trials.



ITALIAN ALMOND KERNELS GRADED ACCORDING TO TRADE REQUIREMENTS.

Below 34,
11-12 mm.

34-35,
12-13 mm.

35-36,
13 14 mm.

34-36,
34-35 and 35-36 mm.

36-37,
14-15 mm.

36b-37,
14½-15 mm.

37-37b,
15-16 mm.

37b-38,
17 mm.

Most almonds in this State are on almond roots, and this is the best stock when soil moisture and drainage conditions are favourable. Trees on this stock will thrive in comparatively dry soils, but if the conditions are too dry they will not produce good crops or develop into large trees. However, if the soil is deep and of good texture and the rainfall at all adequate, sufficient moisture can generally be retained in most years to enable the trees to grow and bear fruit, and when extra dry years do come the almond stock will carry the tree over a few dry years as well or better than any other

Hardshell almonds are often recommended as being superior to softshell for seedlings, but this has never been proved definitely. From the little experimental work that has been done, it would seem that there is as much variation amongst seedlings grown from seed from different hardshell trees as there is amongst seedlings from sweet almonds. Providing vigorous healthy stocks are obtained, there seems to be no reason for preferring the hardshell to the softshell.

Peach stocks are used largely by nurserymen in other States, particularly Victoria. Where irrigation is practised or where soil moisture varies much in different parts of the orchard, it may be satisfactory but peach stocks are not popular in South Australia even where almonds are grown under irrigation. Even in the rather dry non-irrigated areas where most of the almonds are grown in South Australia the almond stock gives better results than the peach.

Plum and apricot stocks have not proved suitable in California. On the plum the almond outgrows the stock, though it makes a strong union. On the apricot the almond grows well for a time, but the union is not satisfactory, and it frequenly breaks off before the tree reaches the full bearing stage.

Almond seeds germinate readily if sown early in a reasonably friable soil, and a fair proportion will develop into seedlings large enough to receive buds during the late autumn. In the following spring the dormant buds should develop into trees suitable for planting out in the orchard two years from seed sowing. It is possible under very favourable conditions with irrigation to raise trees in one year, and it is claimed that they do very well, but the dormant bud is the more usual practice.

Planting.

Planting should be done in late autumn season after the first good soaking rain and while the soil is still warm. If planted later in winter the almond is the most difficult of all orchard trees to transplant successfully, and more losses occur with almonds than with other fruit trees. Before planting the land should receive the same careful preparation usually given for other fruit trees.

The almond is a deep-rooting tree which draws heavily on the plant nutrients in the soil. To ripen a heavy crop of nuts the tree must draw upon the mineral matter in a large area of soil to mature the kernels properly, so that almonds do better when planted at a greater distance than the average orchard trees—24ft. x 24ft. or even 30ft. x 30ft. are considered suit[illegible]nces apart to plant them.

Pollination.

The question of cross pollination or the lack of facilities for cross polination is considered to be one of the chief limiting factors in the cultivation of the almond. It has been established by investigation in California that most varieties of almonds are self-sterile. In addition, certain almond varieties are intersterile. For example, I.X.L. and Nonpareil will not cross-fertilise each other. Varieties with coincident flowering periods should be interplanted to provide for cross fertilisation.

From data collected at the Fullarton Orchard the early flowering varieties are Brandis, Chellaston, Peerless, White Brandis, and Rock Jordon. The next in order of flowering are Pitkins, Josis B P, Ne Plus Ultra, and the late-flowering varieties are Hatch's, I.X.L., Johnston's Prolific, and White Nonpareil. These are the most favoured varieties grown in South Australia, and if interplanted, adequate cross-fertilising facilities should be provided. The question of suitable pollenisers for each variety has yet to be studied as well as the question of viability of the pollen.

It has not been possible to deal with all aspects of almond culture in this short talk, but if further information is desired application may be made to the Horticultural Branch of the Department of Agriculture.

Marketing of Eggs

An address broadcast through Station 5CK by Mr. W. Aird, Assistant

Generally speaking, South Australia is well suited from a climatic point of view for the production of eggs. During the summer months, however, our Hills districts have an advantage over the Northern plains on account of the much cooler weather in the former. To produce first-quality eggs a plentiful supply of greenfeed all the year round is necessary, and with few exceptions the growing of greenfeed is another aspect in favour of the cooler Hills districts.

South Australia exports large quantities of its egg production throughout the year and only a small portion is absorbed by the local demand. The latter is regrettable, as the local market is the most satisfactory, providing, of course, that there is sufficient demand to absorb the greater portion of the production. The egg industry is, however, fortunate in regard to having certain markets beyond our own State for the disposal of surplus production. From July to about the end of November each year, practically the whole of our top grade surplus is exported to the United Kingdom. This marketing period coincides with our spring months, which, of course, is the hen's most natural producing period, and consequently means that our percentage of surplus over local demand is much greater than it is at any other time of the year.

The overseas market demands only the best quality egg, as there are many other countries from which Englands supplies can be imported. It is necessary for our producers, therefore, to do their utmost to market their eggs in a condition that warrants no room for complaint in regard to quality.

The Department of Agriculture spares no efforts in the direction of educating producers to market their eggs in the condition required. The producer who deals with eggs in an unsatisfactory manner is to a large extent a hindrance to the industry. If consumers could be more certain of the quality of the eggs they purchase the local demand would be much greater than it is to-day.

In order to decide whether an egg is fresh or otherwise it is necessary to test it with the aid of a powerful light. By this means the size of the air cell can be determined and incidently whether the egg is fresh or stale. The air cell is situated just inside the large end of a normal egg, and whereas the cell can quite easily be seen when testing an egg a few hours or more old, they are difficult to find in an egg if tested immediately after being laid.

The shell of an egg is of a porous nature. Consequently if eggs are allowed to remain in the nests too long or, after having been collected, are placed in unsuitable places, such as a warm to hot room, or worse still a room that is warm to hot and also has a draught passing through, it will cause the contents of an egg to dry out very rapidly. The more drying out that takes place the larger the air cell becomes, so one can quite easily realise that it is possible that an egg, say, only two days old and having been treated in an unsatisfactory manner, may have as large an air cell as a two-week old egg that has been given the proper care and attention.

During the hot months eggs should be collected at least twice and better still three times a day from the nests. Any that are not perfectly clean should have the dirt removed as soon as possible. Eggs should be placed in the coolest room that is available, and also one that is free from direct draughts.

Reverting back to the shell of an egg being of a porous nature, care must be taken when cleaning that as little moisture as possible is used, as there is a grave danger of dampness penetrating inside the shell when excessive moisture is applied.

The result of dampness getting inside an egg is the formation of a greenish mould, and hence rapid deterioration in quality.

Eggs should be forwarded to the packing floors as often as possible, and on no account less than twice per week in the summer months.

The old method of packing eggs in chaff has been, generally speaking, dispensed with, and the modern method is to pack them in standard cases included in which are cardboard fillers—a space for each egg.

The latter method has proved itself a definite improvement in many ways over the chaff packing. When eggs are packed in chaff there is danger of the fine dust that is always more or less found in chaff clogging up the pores of the shell, thus causing damage. Again, eggs that are clean when packed in chaff will very often be quite the reverse on arrival at the packing floors.

As the cells are just inside the large end it is only reasonable to expect that the eggs will carry to the best advantage when packed with their large end uppermost, so that the content of the egg is not weighing on the cell. If eggs are packed with the small end uppermost there is a danger of the air cell becoming fractured, and when this is fractured the eggs cannot be classed as first grade. Such details in packing are quite easily adhered to when the cardboard containers are used, whereas they cannot be carried out with chaff packing.

The fractured air cell is a defect, perhaps more common than any other, in eggs that are graded as not being up to the required standard for export overseas.

The Department of Agriculture is conducting research to discover the main cause of eggs having fractured air cells, and there need be no hesitation in stating that neglect of the following details are at least contributing causes of the trouble.

The position of the nests should always be in the coolest part of the laying house. Exposure to the full strength of the sun results in the contents of the eggs, especially the white, being affected at the time of collection. The necessity of collecting eggs frequently from the nests to maintain the best quality cannot be over-emphasised, and when collecting eggs bumping the container on the ground or gate of the pens should be avoided, as this frequently causes much damage.

Shell grit should always be available for the laying hens to eat when they so desire. It is also wise to add a small percentage to the mash fed them each day, so that the hen that is careless in regard to helping herself from the shell grit hopper will consume some when she is fed with the mash. Broody hens should never be allowed to remain in the laying house as they cause much deterioration in the eggs if only allowed to sit on them for a few hours.

The infertile egg is preferable to the fertile egg for marketing and every effort should be made therefore to ensure that eggs for marketing purposes are infertile. When eggs are fertile and are exposed to the heat or sat on by a broody hen, germination will take place, and the egg soon becomes a total loss.

It has been a fairly general practice in this State to use kerosene or petrol tins for collecting eggs from the nests. These containers are not suitable to gain the best results. They hold the heat too much, especially for the eggs at the bottom of the bucket. When full they hold approximately 200 eggs, so there is a considerable weight on the eggs in the lower portion. The kerosene or petrol tin also has the disadvantage of not being rigid enough to withstand the weight, causing the sides of the tin to press inwards when lifted, with the consequent result of crushing some of the eggs. Wicker baskets to hold about 100 eggs give the best service.

A suitable room for storing eggs while awaiting transport is a very necessary adjunct on any premises where eggs are being produced commercially. The room should be cool, well ventilated, and designed so that the temperature is not unduly affected by the outside climatic condition. An underground or partly underground room, well ventilated, but free from draughts is recommended.

On no account should eggs be handled more often than is necessary, as every additional handling increases the risk of doing harm to the eggs.

Where rail and road transport over long distances is necessary, some form of protection to minimise the vibration that takes place should be provided. Placing a straw mattress on the floor of the vehicle is a modern method in use, and an appreciable improvement in the quality of the eggs is maintained.

Egg Pulp.

Pulping eggs is a branch of the egg industry that has grown considerably during the last few years. Generally speaking, eggs that are used for pulp making are those that have minor faults, such as:—

Slightly larger air cells than those required for the egg in shell trade.

Eggs with fractured air cells.

Undersized pullet and misshapen eggs.

Some producers have the idea that an egg in any condition is good enough for pulp making. This view is incorrect, as it is reasonable to expect manufacturers to make quality pulp by using only good quality eggs or those with the minor faults. The pulp trade is a means of absorbing a large percentage of our surplus, including the minor fault eggs.

Facts Concerning Autumn and Winter Egg Production

An address broadcast through 5CK by C. F. Anderson (Chief Poultry Adviser).

The factor of autumn and winter egg production is one that requires all the skill and experience that the poultry breeder can bring to use if he is to be successful at this particular phase of the industry. Yet from an egg producing point of view it is necessary to obtain reasonable production during these months if one is to be a success as a commercial egg producer. If the average poultry producer, whether on a small or large scale, reflects for a while, he will realise that the lowest period of production for the year is during the months of March, April, and May. It is so every year, and should give the thoughtful person room for reasoning why such is the case. On many wheat farms, where poultry is more or less a side-line, eggs are very scarce during the autumn months. In the suburban areas, it will be found that during the spring months various produce vans and egg collectors will be bringing in supplies of eggs to the egg floors, while during the autumn months they will be taking supplies there. It can be seen, therefore, that the shortage during these months is general. Again, the values of eggs during the autumn months are the highest for the year; peak values are reached during the month of May. First it should be realised that consistent autumn and winter egg production cannot be obtained by mere chance. It is a factor that must be studied from many angles, and can briefly be discussed under the following headings:—1. Breeding. 2. Hatching. 3. Rearing. 4. Housing. 5. Feeding.

In reviewing the question of breeding, the important fact should be recognised that satisfactory autumn production is only obtained from pullets; the older birds such as first and second season hens are moulting during that period, therefore it can be seen that concentration with the pullets is of importance.

Breeding Stock.

Where autumn and winter production is the aim, careful selection of breeding stock is essential. There is no doubt that autumn and winter production is an hereditary character, and selection of stock should be made accordingly. That brings one right back to the lay of the pullets during their first laying season. The haphazard selection of breeding stock just by external character cannot be expected to ensure reasonable production. It is the continued selection of breeders based, firstly, on reasonable conformity to standards, and, secondly, to a knowledge of the production of the parent stock that is largely neglected by present day poultry breeders. No live-stock industry can be successful unless the quality of the stud stock is maintained at a high level, and poultry breeding is no exception. Now, assuming that autumn and winter production is an hereditary character, it of necessity brings one to the point of individual testing, whether by single testing or trap nesting of a percentage of the stock. This testing, to be of any commercial value, should be commenced on 1st April, and any pullet that moults during the period from April to end of July should be rejected as a future breeder. Where no means of individual testing are available to the breeder, he should have a supply of legbands, and as he sees the pullets in the laying sheds moulting between the period of April to July, he should place a legband on them so they can be identified when the selection of breeding stock is being made. Where the system of single testing is followed, those birds which do not record a reasonable score by the end of July should be discarded from the testing pens. Egg laying competition results, particularly those conducted at the Parafield Poultry Station, show that a bird to have any chance of success in the competition must record a good score during the winter test—that is, the period from 1st April to 31st July. A minimum score of 80 first grade eggs for the winter test is looked on as a reasonable one.

Hatching.

This also has a most important bearing on autumn and winter production, and is one which is not studied closely enough. During recent years there has been a decided swing in favour of early hatching, and while probably early hatched are to be preferred to late hatched stock, there is no reason why either system should be practised on a well-managed farm with modern equipment. The risks of poor hatching and heavy rearing losses are reduced to the minimum with present day equipment. However, before discussing the question of hatching seriously, one must keep in mind the breeds being kept, and these can be divided into two sections: firstly, the light breeds; and, secondly, the heavy breeds. Generally the heavy breeds are from six to eight weeks longer in coming to the laying stage than the light breeds. By what is termed "early hatching" for the light breeds is June and July, and late hatching is anything after the end of September. For hatching, however, there are parts of the State where October hatching can be satisfactorily and successfully followed. If one stops to reason for a few minutes, it will be realised that where incubators are running in June and early July, the eggs used at this period must either be laid by pullets or hens that have moulted early, neither of which should be used as breeders where the best results are desired. The best birds—and they are generally the late moulters—are not back in production in sufficient numbers to warrant commencing incubators much before the second week in July. The ideal time of hatching for reasonable autumn and winter egg production depends largely on the districts in which one is situated, and that is best found out by the individual concerned in studying the results of the various hatchings. This cannot be based on results of one season, for the reason that climatic conditions have a big influence on the development of the stock. Speaking, however, from a State point of view, the most suitable time for the hatching of light breeds, where autumn and winter production is the objective, is from the third week in August until the end of September, with a slight preference for those hatched during the first week in September. As the great bulk of poultry breeders in this State are dependent solely on the returns from egg production for their existence, the importance of the time of hatching warrants very close study.

Rearing.

This phase is probably the most important of all, and irrespective of what the breeding of the chickens or the time of hatching of same are, the whole of the careful planning of the season can quite easily be upset by poor rearing. Probably no phase of the poultry industry is a more debatable one than the methods of rearing. It seems to be that what system suits one particular individual does not suit another. I would strongly advise anybody who is reasonably successful with rearing by a particular system not to change over to some entirely new method. Now in rearing, one first of all must have a good chicken to commence with, and it should be understood that the early losses are the cheapest in the long run. No weakly or deformed chickens or late hatched ones should ever be placed in the brooders. One of the great faults of the present-day methods of brooding is the too quick development which takes place with the young stock, and which eventually leads to early maturity. Early maturing stock are seldom profitable as egg producers. They come into production somewhere about 4 to 4½ months, will lay reasonably well for probably 2 to 3 months, and generally the egg is abnormally small; then they go into a moult for some weeks. This obviously is not profitable from an egg producing point of view. Early maturity can be put down generally under two headings: firstly, early hatching—I have already dealt with that aspect—and, secondly, methods of brooding and feeding. In these days, when the battery brooding system is very popular, the growth of the chickens in the first 3 to 5 weeks under this system is abnormal, and unless growth is slowed up reasonable production will not be obtained. It should first be recognised that where a good annual lay is aimed at, the object should be to have the pullets coming into production at from 5 to 5½ months with the light breeds, and 6 to 6½ months with the heavy breeds. Under some of the methods of rearing, however, we see stock coming into lay at from 4 to 4½ months, and this should be avoided wherever possible.

Battery rearing has proved successful under certain conditions: do not hold the chickens any longer than 3 weeks under this system of brooding, then they should be given at least 2 to 3 months on free range, so that the rate of development is slowed up, and it allows the pullets to fully mature and gives them both the body and stamina that is necessary for reasonable production. No matter what system of brooding is practised, it will always be found an advantage to give the chickens as much free range as possible. By free range it is not meant running batch after batch of chickens on the same ground. Fresh ground or pastures wherever possible should be provided for each batch of chickens.

Housing.

This is one particular aspect that does not receive the attention that is necessary—particularly so for the pullets. On almost every poultry farm one visits there is a shortage of housing for pullets, with the result that they are either overcrowded or kept too long on stale ground. Where autumn and winter production is aimed at, the principal point that should be considered is that these months are the coldest months of the year, therefore the housing should be warm, to ensure reasonable production. There are very many designs of housing, the favoured one of which for this State seems to be the lean-to type of roof. In order to obtain reasonable production during those months, it is necessary to have as much sunlight as possible. Therefore, the direction in which the houses face is all-important, and I would suggest that the ideal situation is either north or a little east-of-north for the majority of the districts of the State. The houses should be so constructed that the maximum amount of sunlight and warmth is got into them during the cold months without unduly closing the fronts up with shutters, glass, etc.

One can go to the other extreme by keeping the houses so closed up, in order to keep the birds warm, that the ventilation is very poor, and the stock are constantly inhaling bad atmosphere.

Particular attention should be paid to the sleeping quarters to see that they are kept dry, and the floors, during the autumn and winter months, under the perches should be raked over every morning and from one to two inches of dry sand placed under the perches. In particularly heavy rainfall districts drains should be made all around the house and guttering put on the back of the house to prevent soakage. Scratching litter should be used freely during these months, firstly to keep the floors dry, and secondly to provide exercise for the birds in scratching for the grain.

Feeding.

There is a well-known phrase among poultrymen—that half the production of a bird is dependent on the method of feeding. There are various methods of feeding adopted by breeders, and it is not my intention to discuss the advantages and disadvantages of those particular methods. It is sufficient to say that where a reasonable production is the aim, the continuity of feeding of whatever method is decided upon, and the regular hours of feeding, are essential to success. For many years experiments of all methods of feeding have been conducted at the Parafield Poultry Station, and I think it would suffice if I gave the methods adopted in the egg laying competition as a guide. It should be understood that these methods are those which have only been decided on after many years of experiment and collection of data as to the results obtained. The standard method of feeding adopted in the competition is:—Morning, wet mash composed of equal parts by weight of bran, pollard, and whole meal, 1lb. meat meal per 100 birds, and ½lb. linseed meal per 100 birds. Chaffed green feed is added to the mash in proportions varying from 40 to 60 per cent., according to the season. The smaller percentage is fed during the cold, wet months, and the higher percentage during the summer months. In addition 1lb. charcoal and oyster shell grit per 100 birds is added to the mash, and is also available in hoppers at all times to the birds. At midday 1oz. wheat per bird is fed in scratching litter, and in the afternoon 1oz. wheat is again fed.

Very accurate records are kept of the quantity of food consumed per bird a day, and for the 1936-37 competition the actual quantity of wheat consumed per bird a day was 1.98oz. and 1.59oz. of bran, pollard, and whole meal, which in actual practice is ½oz. of bran, pollard, and whole meal per bird per day, and 2oz. wheat.

If the facts which have been mentioned in this paper are closely studied, with particular attention to the selection of breeding stock, the time of hatching and feeding, I believe that we would see a gradual improvement, not only in the question of autumn and winter egg production, but also in the type of stock generally, and, after all, the very existence of the industry depends on the improvement of our stock throughout the State.

The Poultry Stickfast Flea *(Echidnophaga Callinaceae)*

[By R. H. F. MACINDOE, M.R.C.V.S., Deputy Chief Inspector of Stock.]

The Poultry Stickfast Flea which affects particularly poultry, pigeons, dogs, and cats in the sandy areas of the State, is a serious menace to the poultry industry, not only because of the losses of poultry which may occur, the consequent diminution in the egg output, and general loss of condition of affected fowls, but its eradication is a long and tedious process. Each bird must be handled individually, and other necessary work requires systematic attention in all details, such as keeping the yards and houses clean and free from litter and manure. This all means much labour and loss of time.

There is, however, another serious aspect if the disease is allowed to run unchecked, and that is the restrictions placed on poultry and pigeons by the other States of the Commonwealth, which vitally affect the interests of the commercial poultry keepers and the racing schedules of the Homing Pigeon Clubs in this State. The suburban owner of poultry, who keeps a few fowls in the back yard fails to realise what far-reaching effects this pest may have on the poultry industry, also does the farmer in the country. He allows his birds to wander wherever they will — into machinery, sheds, stables, haystacks, yards, and around the milking bails, &c., and to roost in trees, resulting in the accumulation of fowl excreta into mounds which, in the case of infested birds, become prolific breeding grounds for the flea. The same remarks apply to nests which may be found in sheds, under hedges, in haystacks, &c.

It is with the object of giving information about this pest and describing the methods to adopt in controlling its spread and eradicating the flea from infested properties that this leaflet is written.

In the first place, the Poultry Stickfast Flea is one of the scheduled diseases proclaimed under the provisions of the Stock and Poultry Diseases Act, 1934, of this State, and is, therefore, a disease the presence of which must be reported to the nearest Stock Inspector or to the Chief Inspector of Stock, Adelaide, within 24 hours of being seen, and steps taken immediately to isolate affected stock. Failure to carry out these conditions renders owners liable to heavy penalties.

Though the presence of the flea has to be notified, it must be realised that it is beyond the powers of the Stock and Brands Department Inspectors personally to visit infested premises and to supervise and instruct owners on the work essential for eradicating the flea. It cannot, therefore, be too strongly emphasised that the question of eradicating the flea and preventing its spread to clean areas, is, and must remain in, the hands of the poultry keeper himself. He must, however, also realise that failure to carry out instructions issued by an Inspector renders him liable to a heavy fine.

In this State, the Poultry Stickfast Flea has been found on poultry, pigeons, dogs, and cats on Eyre's Peninsula, in and around Port Augusta, Wilmington, Baroota, Port Pirie, Nelshaby, Bumbunga, Two Wells, Salisbury, Morgan, Waikerie, Taylorville, Port Vincent, and at the Semaphore and Largs Bay district. Possibly—and probably—there are other areas where the flea is present, but not yet been reported.

How the Flea is Spread to Clean Areas.

The flea may be spread by motor transport, railways, boats, airways, through poultry markets, private sales or gifts, and indirectly by dogs and cats, rodents—such as rats and mice—rabbits, and by the owners of infested poultry conveying the flea on clothing, such as their socks. Old crates, fittings from fowl runs, fowl houses, boxes used for nesting, poultry and pigeon manure harbour the flea and eggs, and may therefore convey the pest from one place to another when transported from an infested area.

How the Flea is Retained on Infested Premises.

The Poultry Stickfast Flea lays eggs which drop off infested birds and later develop into maggots; these in turn become pupae (cocoons), and may remain dormant for a long period before developing into adult fleas, which attach themselves to their hosts (the fowls) and commence to lay eggs, and so repeat the life cycle.

If poultry are allowed, as is usually the case on farms, to wander through the machine sheds and stables, and lay their eggs in out-of-the-way places, such as hedges, haystacks, and roost in trees, or are allowed to perch on the beams of the stables and other sheds, the eggs of the flea drop to the ground, and provided there is a degree of moisture, hatch out and the maggots which develop burrow into the ground. If the conditions are drier, the eggs lie dormant on the ground until rain comes and then they hatch out the maggots.

Cats and dogs become infested by lying about sheds, &c., where infested poultry have been, and convey the flea to other centres.

Therefore, when the flea is noticed on poultry, the fowls should be at once confined behind wire netting, and the enclosure kept free of litter, debris, and manure. Containers for drinking water, and the nesting boxes, should be moved frequently, in order to allow the ground to dry out.

The houses in which fowls roost should have an impervious floor, and the manure regularly removed at least twice a week. If the floor is of a sandy nature, iron trays or a cement floor should be installed, but if a cement floor is put down it should be laid well and free from cracks, otherwise the flea can develop in them.

Keeping the floor of houses saturated with water will prevent the development of the flea, and this method can be employed where there is an adequate water supply. All manure removed should be submerged in water in an iron container for seven days, in order to prevent the development of eggs and maggots. The manure should then be buried in the garden. This applies particularly to suburban areas.

On farms, the manure should be treated as above, or may be buried deeply underground, or spread in a thin layer over the fallow where the heat of the sun will kill the maggots. Dogs and cats infested with the flea should be treated as will be indicated later.

In the suburban areas especially, the cat is one of the greatest problems in eradicating the flea, owing to the number of strays which wander from place to place, often carrying a heavy infestation of the Poultry Stickfast Flea.

As measures for the control and eradication of this flea are based on a knowledge of its life history, the following brief outline is given.

Life History.

The Stickfast Flea is a true insect, being wingless, but possessing great powers of leaping. Its food consists of the blood of birds or warm-blooded animals.

It is the most important of our livestock-infesting species, and is primarily a poultry pest, but is also found infesting native birds and animals, horses, dogs, cats, rats, mice, and rabbits.

The adult fleas spend almost the whole of their existence attached to their hosts, and do not move about the body as other species do. In poultry they are most commonly found attached to the heads—often in masses about the eyes, comb, and wattles—but they may be found on the neck and various parts of the body, especially when parts are devoid of feathers, as, for example, during moulting. In the case of dogs, cats, rats, and rabbits they are found embedded in the ears and nose, and between the toes or any parts of the body not covered with hair.

The flea passes through four distinct phases, viz.:—

1. The egg which hatches out in about four days, into
2. The larva, or maggot stage, which varies according to food supply, moisture, and temperature.
3. The pupa or cocoon stage averages about 14-16 days in summer, and then becomes
4. The adult flea.

1. The Egg.

Though small, the egg may be seen with the naked eye. It is dropped by the female flea while attached to the host bird or animal, and each female flea is capable of producing a great many eggs. The egg hatches out in 4-6 days during the warm season of the year.

2. Larva or Maggot.

The maggot is hatched out from the eggs, is small, worm-like in appearance, and almost pure white, about 1/25in. long; it is legless, eyeless, and the body is divided into 13 segments. They live below the surface of the soil, where they move about freely in search of food, which consists of partly-digested blood of the host (fowl or animal) which has been evacuated by the adult flea dropping to the ground. The organic matter—animal or vegetable—contained in fowl droppings, is also food for the maggot.

These materials, unless cleaned up regularly, find their way into cracks and crevices on the ground, in the nesting boxes, &c., and are even mingled with the sand and soil about the roosting places in roosting houses. This all helps to provide breeding grounds for the flea.

During the growing period the maggot (larva) passes through two moults, and when full grown is about ⅛in. long. ***This larval (maggot) period of life varies according to the available food supply, moisture in ground, humidity, and temperature.*** Moist summers are favourable to the development of the maggot, as during such seasons enough moisture is supplied to the organic matter in the soil and dust in cracks of woodwork, &c., to mature the maggot successfully. Excessive moisture and excessive dryness and heat are unfavourable to the development of the maggot.

3. Pupa or Cocoon Stage.

When the maggot has passed its second moult, and becomes mature, it passes into the pupal or cocoon stage, in which the maggot spins a silk-like cover around itself, which is found buried in the ground. It may be white or brown in colour, and often covered with particles of sand, dust, etc. Within this cocoon, the maggot sheds its final skin and enters into a resting or hibernating stage. This resting period may be lengthy or short, according to the time of the year, climatic conditions, and temperature.

In the summer, the resting stage is about 14-16 days under favourable conditions, and in the winter it may remain dormant all the season. At the end of this resting period, the adult flea splits the cover (pupa case) and emerges to carry on the reproduction of another generation.

4. The Adult Flea.

The adult flea is dark brown to almost black in colour, and shiny. It measures about 1/25in. in length, being much smaller than the dog and cat flea. Dog and cat fleas move freely about the body, and do not stick tight to the host, thus differing from the flea under discussion.

The adult flea has well-developed legs which gives it strong jumping powers. Its mouth consists of an arrangement of pointed and barbed organs, which enable it to pierce the skin of its host and at the same time hang on, hence the name "Stickfast." The flea is difficult to remove, owing to this barbed arrangement of the mouth parts.

The female flea is larger than the male, and lighter in colour, due to the abdomen becoming distended with eggs.

An important point to bear in mind is that the Poultry Stickfast Fleas differ from the ordinary fleas in that they remain attached to the host all the time they are alive, whereas the ordinary fleas only attach themselves while feeding on their hosts; at other times they move freely all over the body. A meal of blood is necessary for the female Stickfast Flea before she can successfully produce fertile eggs.

Length of Life of the Adult Flea.

The life of the adult flea depends upon the availability of food, *which is blood,* and climatic conditions. Moderately warm and moist weather is more favourable than cold weather. Hot, dry weather soon proves fatal to the hoppers before they reach their hosts. The larvae or maggots are sensitive to dry hot weather, and to excessive moisture in the soil. The eggs and pupae are able in a great measure to survive the winter. A number of adult fleas survive the winter on birds and other hosts. These carry-over stages are sufficient to start a fresh outbreak when the more favourable warm weather comes in.

Symptoms of Stickfast Flea Infestation.

Infestation by this particular species is easy to determine, as the fleas are always found attached to those parts devoid of feathers or fur. They may be mistaken, at first glance, on poultry for small blood specks on comb and wattles, but closer examination shows that they are the fleas.

In dogs, they are frequently found between the toes, the dog giving evidence of their presence by biting the parts, but the common site is on and around the eyes, ears, and nose.

Measures for Control and Eradication.

After a study of the salient points in the life history cycle of the flea, it will be seen that any measures taken must be based on the life history.

As most of the eggs are laid during the night, they can be destroyed if the fowls are housed properly and forced to perch in a house. The eggs will then be dropped from the perches, and by the use of iron trays or properly cemented floors the tiny maggot is prevented from boring into the ground. When the egg hatches after having been deposited under the perches on to an impervious floor, the maggot is either devoured by the fowls, or dies from lack of nourishment. In this way the adult flea when it reaches the age of death is not replaced by others.

Though it is most important for the droppings to be collected on an impervious floor, it is also most important to keep fowl yards and runs free of litter and debris, and any shady trees in such yards or runs should have their lower limbs removed, in order that the sun may penetrate all portions of the enclosure at some time during the heat of the day.

By restricting all the movement of poultry to an enclosed area, they cannot become re-infested if once clean and the measures outlined have been carried out.

Keeping the soil of the houses used by poultry saturated with water is satisfactory if properly done, because this kills the maggots. However, there is always the danger than through thoughtlessness or carelessness this will not be done regularly, with the result that the ground is kept only moist, which under favourable conditions would be an ideal state for the development of the maggot.

Treatment of Fowls, Dogs, Cats, and Infested Premises.

All birds must be kept closed in a yard or run. The houses, runs, and nests must be kept clean. Affected birds must be dressed regularly. Satisfactory arrangements must be made for the disposal of poultry manure. Dogs and cats must be excluded from runs and houses, and enclosures where poultry are kept should be ratproof.

The following routine must be carried out in infested premises:—

1. Affected Birds.

The fleas attack the bare parts of the face, the comb and wattles, which must be dressed once a week with neatsfoot oil. The dressing can be applied economically with a small brush. If neatsfoot oil is not procurable, use castor, linseed, or other non-irritating oil.

2. Disposal of Manure.

The droppings should be removed at least once a week, but more often if possible. If the floor is not paved an iron tray must be placed beneath the perches to collect the droppings. The fowl manure should be burned, or if required for fertilising purposes be placed in a watertight container and covered with water for seven days before use.

3. Yards and Houses.

The yards, houses, and nests must be kept clean. The yards should be cleaned up once a week and the litter and sweepings burned. It is strongly recommended that the houses should be paved with cement or other impervious material, and that the nests be constructed of iron or kerosene tins, raised off the ground and bedded with shell grit or coarse sand. One dressing of quicklime (hot lime) should be given in the houses. Where the floor is of earth it should be kept, as far as practicable, soaked with water.

4. Egg Boxes.

Boxes used for packing eggs must be kept clean, must not come in contact with poultry, and must not be stored in the proximity of poultry.

5. Dogs and Cats.

Oil dressings for dogs and cats should be applied to infested areas as directed for fowls, and the kennels and all bedding should be thoroughly cleaned either by scrubbing or boiling, and then exposed to strong sunlight.

Rabbits, rats, and mice should be destroyed and the carcases burned or buried deeply.

Herd Testing Results

The Supplement in this issue contains a record of:—

1. **Production figures, under Official test, of pure-bred cows which completed their tests during the quarter ended 31st December, 1937.**
2. **Herd Testing Associations (not official) production figures for months October to December, 1937.**
3. **Annual production figures (not official) of the Lake Albert and Jervois and the Mount Barker Herd Testing Associations, 1936-37.**

Below, Mr. H. B. Barlow (Chief Dairy Instructor) reviews the results of the various classes in the Official Tests.

Junior 2 *Year Old* (*Standard* 230*lbs. Fat*).—In this class 15 animals (1 Friesian, 11 Jerseys, 2 A.I.S., and 1 Ayrshire) were submitted to test; 11 cows (1 Friesian, 7 Jerseys, 2 A.I.S., and 1 Ayrshire) completed 273 days test and 1 Friesian, 6 Jerseys and 1 A.I.S. obtained certificates, headed by Mr. C. J. Morris' "Murray Glen Segis Wistaria" with 333·53lbs. butterfat.

Senior 2 *Year Old* (*Standard* 250*lbs. Fat*).—10 cows (7 Jerseys, 2 A.I.S. and 1 Ayrshire) were submitted to test; 9 cows (7 Jerseys and 2 A.I.S.) completed 273 days and 7 Jerseys and 1 A.I.S. reached the required standard; and 3 cows, all Jerseys, produced over 350lbs. fat, headed by "Roseworthy Lady 10th" (Roseworthy Agricultural College) with 412·05lbs. butterfat.

Junior 3 *Year Old* (*Standard* 270*lbs. Fat*).—5 cows (3 Jerseys, 1 A.I.S. and 1 Ayrshire) were submitted to test; 3 cows (2 Jerseys and 1 A.I.S.) completed 273 days, and 3 cows (2 Jerseys and 1 A.I.S.) obtained certificates; 2 cows, both Jerseys, produced in excess of 350lbs. fat, headed by "Glen Ewin Sweet Rose" (Roseworthy Agricultural College) with 491·89lbs. butterfat.

Senior 3 *Year Old* (*Standard* 290*lbs. Fat*).—10 cows (7 Jerseys and 3 A.I.S.) were submitted; 8 cows (6 Jerseys and 2 A.I.S.) completed 273 days, and 6 cows (5 Jerseys and 1 A.I.S.) obtained the required standard; 2 cows, both Jerseys, produced in excess of 350lbs. fat, headed by "Brinkworth Regina" (C. C. T. Ottens) with 399·82lbs. butterfat.

Junior 4 *Year Old* (*Standard* 310*lbs. Fat*).—5 cows (1 Friesian, 3 Jerseys and 1 A.I.S.) were entered; 3 cows (1 Friesian, 1 Jersey and 1 A.I.S.) completed 273 days, 3 cows (1 Friesian, 1 Jersey and 1 A.I.S.) obtained certificates; 3 cows produced over 350lbs. fat headed by "Murray Glen Inka Ashlyn" (Mr. C. J. Morris) with 456·27lbs. butterfat.

Senior 4 *Year Old* (*Standard* 330*lbs. Fat*).—8 cows (4 Jerseys and 4 A.I.S.) were submitted; 5 cows (3 Jerseys and 2 A.I.S.) completed 273 days; 2 cows both Jerseys, obtained certificates, headed by "Pella Empress Lotus" (W. P. Eckermann) with 435·11lbs. fat.

Mature Cows (*Standard* 350*lbs. Fat*).—28 cows (3 Friesians, 14 Jerseys, 8 A.I.S. and 3 Ayrshires) were submitted; 20 cows (3 Friesians, 10 Jerseys, 5 A.I.S. and 2 Ayrshires) completed 273 days; 12 cows (3 Friesians, 6 Jerseys and 3 A.I.S.) obtained certificates, headed by "Murray Glen Princess Maggie" (C. J. Morris) with 683·51lbs. fat.

In all 81 cows were submitted to test; 59 completed their period of 273 days and 42 passed the required standards.

Summarising the results of different breeds for the period :—

Breed.	Submitted.	Completed 273 days.	Obtained Certificate.
Jerseys	49	36	29
A.I.S.	21	15	8
Ayrshires	6	3	—
Friesians	5	5	5

Best two cows in each class :—

	Lbs. Milk	Average Test. %	Lbs. Butterfat.
JUNIOR TWO.			
Mr. C. J. Morris' "Murray Glen Segis Wistaria"	9,442½	3·53	333·53
Mr. W. P. Eckermann's "Pella Marina Doone"	6.198½	4·60	284·92
SENIOR TWO.			
Agricultural College "Roseworthy Lady 10th"	6,319½	6·49	412·05
Agricultural College "Roseworthy Floral 2nd"	6,726	5·81	390·84
JUNIOR THREE.			
Agricultural College "Glen Ewin Sweet Rose"	8,605½	5·72	491·89
Mr. W. P. Eckermann's "Pella Lassie Doone"	8,521½	4 92	419·22
SENIOR THREE.			
Mr. C. C. T. Ottens' "Brinkworth Regina"	6,630	6·03	399·82
Mr. W. P. Eckermann's "Pella Mercedes Doone"	7,183½	5·46	396·01
JUNIOR FOUR.			
Mr. C. J. Morris' "Murray Glen Inka Ashlyn"	12.468	3·66	456·27
Mr. E. W. Pfitzner's "Delma Blonde's Lotus	7.755½	5·51	427·53
SENIOR FOUR.			
Mr. W. P. Eckerman's "Pella Empress Lotus"	7.464	5·83	435·11
Mr. W. P. Eckerman's "Pella Duchess Kelly"	6,064½	6·11	370·30
MATURE.			
Mr. C. J. Morris' "Murray Glen Princess Maggie"	14,435	4·74	683·51
Mr. C. J. Morris' "Murray Glen Griselda Burkeyje"	15,729	4·20	660·65

For the purpose of comparison, the following are the names of the cows holding State records, irrespective of breed, in their respective classes as at 31st December, 1937.

Junior Two-year-old—" Pulluwewal Jean " (Mrs. A. E. Bowman), Jersey, 516·66lbs. fat.
Senior Two-year-old—" Lanacoona Brown May " (C. E. Verco), Jersey, 633·73lbs. fat.
Junior Three-year-old—" Murray Glen Beets Superior " (C. J. Morris), Friesan, 594 52lbs. fat.
Senior Three-year-old—Lanacoona Brown May " (C. E. Verco), Jersey, 681·37lbs. fat.
Junior Four-year-old—" Kiama Robin 2nd " (E. and A. Nicholls), A.I.S., 703·03lbs. fat.
Senior Four-year-old—" Murray Glen Princess Maggie " (C. J. Morris), Friesian, 701·02lbs. fat.
Mature—" Murray Glen Sylvia Topsy " (C. J. Morris), Friesian, 828·26lbs. fat.

Tubercle Free Herd Scheme.

The following herds have been tested and comply with the conditions laid down by the Tubercle-Free Scheme, whereby stud-owners may apply to have their herds tested, free of charge, by the Stock and Brands Department:—

Owner and Address.	Cattle. No. of	Date. Expiry
1. J. H. Dawkins, Para Wirra Jersey Stud	**25**	**16/4/38**
2. W. Hawker, Anama Friesian Stud, Central Bungaree, *via* Brinkworth	**37**	**25/11/39**
3. O. H. Woodward, Marama Jersey Stud, Gilles Plains	**22**	**2/11/38**
4. G. L. Hampton, Cloverdale Illawarra Shorthorn Stud, Echunga	**25**	**12/8/39**
5. J. M. Bray, Sweethaven Jersey Stud, Langhorne's Creek	**26**	**19/8/39**
6. Kybybolite Experimental Farm, Kybybolite	**88**	**1/9/39**
7. A. Kelly, Alexandra Jersey Stud, Milang	**38**	**21/10/39**
8. Agricultural College, Roseworthy	**70**	**9/11/39**
9. E. F. Schulz, Eden Valley	**30**	**16/12/39**
10. M. A. Clark, Echunga	**6**	**19/11/39**

Parafield Egg-Laying Competition, 1937-38

Review of the Competition for the Month of February, 1938

[By C. F. Anderson (Chief Poultry Adviser and A. Clifton (Competition Attendant).]

Although there were no prolonged spells of warm weather during the month, production fell off considerably. This is probably due in the main to the extraordinary cold week experienced immediately following the hottest and most trying day of the season (17th February). The sudden change threw a number of birds into a complete moult, with a cessation of laying in the majority of cases. Probably some of these birds would have broken up at this time of the year whatever the weather, as every year at this period a number fail to see out the last 6 weeks.

Production for the month was 45.87 per cent., being 6 per cent. lower than that recorded for last month, and 2 per cent. lower than that for the corresponding period last year. Production of first-grade eggs has again been very high, namely, 83.6 per cent., compared with 82.9 per cent. for January.

The leading bird, Rhode Island Red No. 369, forfeited a great chance of registering an exceptionally good score by going broody on the 9th February, and then, following the hot day on the 17th, went into a heavy moult, within two days dropping many feathers, even to the wing and tail feathers. Despite this she again started to lay on the 23rd of the month, and at the end of the month was still level for first position with 240 first-grade eggs. An achievement of this description is rarely seen, and goes to prove that she is an exceptionally good bird.

A good performance was given by Mr. H. J. Mills' White Leghorn No. 16, by laying 13 first-grade eggs in 14 days (mostly 2⅛ozs. in weight) and coming from third position in her section to equal first place on the 28th of the month, with a score of 231 first-grade eggs.

Deaths for the month total 3, being 1 less than for February, 1937, but the percentage for the year at this time is higher than for 1937.

Feeding Tests at Parafield Poultry Station.

A new series of feeding tests was commenced at Parafield Poultry Station on the 1st April, 1937. Five tests have been arranged each of 50 White Leghorn pullets. The principal object of these tests is to collect some accurate data concerning the results obtained from the soaked grain method of feeding in different ways, also the production of the birds under the various methods of feeding. The following is a list of the tests that have been arranged:—

A. Morning—Soaked wheat at rate of 8lbs. grain per 100 birds, meat meal ½lb. per 100 birds, greenfeed same quantity as dry grain. Afternoon—Same as morning, but meat meal ¼lb. per 100 birds.

B. Morning—Soaked wheat at rate of 8lbs. per 100 birds, ¼lb. meat meal per 100 birds, ¼lb. linseed meal per 100 birds, greenfeed same as No. 1 test. Afternoon—Same as morning, but without the ¼lb. linseed meal.

C. Morning—Soaked wheat once a day at rate of 8lbs. per 100 birds, meat meal ¾lb. per 100 birds. Afternoon—Dry wheat at rate of 1¼ozs. per bird.

D. Morning—Soaked barley twice a day at rate of 8lbs. per 100 birds, greenfeed same quantity as dry grain, meat meal ¼lb. per 100 birds. Afternoon—Greenfeed same quantity as dry grain, meat meal ¼lb. per 100 birds.

E. Morning—Soaked wheat and barley at rate of 4lbs. wheat and 4lbs. barley per 100 birds, greenfeed same bulk as dry grain, meat meal ½lb. per 100 birds, linseed meal ¼lb. per 100 birds. Afternoon—Dry grain at rate of ¾oz. wheat per bird and ¾oz. barley per bird.

The quantity of food as stated in the test will vary from time to time according to the requirements of the birds. The quantities stated in the tests are given as a basis, but are also liable to alteration according to the requirements of the stock.

Test.	No. Eggs Laid from 1st April, 1937, to 31st January, 1938.	No. Eggs Laid February, 1938.	Total Eggs Laid from 1st April, 1937, to 28th February, 1938.
A	6,267	411	6,678
B	6,291	566	6,857
C	6,020	545	6,565
D	5,739	468	6,207
E	5,846	568	6,414

	Value of Eggs.		Cost of Food.		Return Above Cost of Food.	Total Return Above Cost of Food.
	1st April, 1937, to 31st January, 1938.	February, 1938.	1st April, 1937 to 31st January, 1938.	February, 1938.	February, 1938.	1st April, 1937 to 28th February, 1938.
	£ *s.* *d.*	£ *s.* *d.*	£ *s.* *d.*	£ *s.* *d.*	£ *s.* *d.*	£ *s.* *d.*
A	29 10 3	2 0 0	10 17 11	0 16 8	1 3 4	19 15 8
B	29 4 8	2 15 0	10 15 0	0 16 8	1 18 4	20 8 0
C	28 3 7	2 13 0	10 17 0	0 16 7	1 16 5	19 3 0
D	26 1 6	2 5 6	11 12 1	1 1 7	1 3 11	15 13 4
E	26 17 1	2 15 3	11 3 3	0 19 3	1 16 0	17 9 10

Production and Exports.

The production of butter and cheese for January, 1938, was:—Butter, 1,560,584lbs.; cheese, 1,473,956lbs.

Meat exports (figures taken from statistics supplied by the Australian Meat Board)—

	Total Australian Exports, July, 1937-January, 1938.	
	Carcasses.	
Mutton	138,319	(S. Aus., 67)
Lamb	3,711,871	(S. Aus., 322,870)
Pigs (porkers and baconers	131,138	(S. Aus., 3,877)
	Cwts.	
Chilled beef	263,941	(S. Aus., nil)
Frozen beef and veal	1,291,997	(S. Aus., 2,917)

South Australian F.A.Q. Wheat—Harvest, 1937-38

MILLING, CHEMICAL, AND BAKING TESTS.

Wheat.

	1933-34.	1934-35.	1935-36.	1936-37.	1937-38.
	%	%	%	%	%
Moisture	9·9	10·1	10·8	11·1	11·2
Impurities (Screenings, &c.)	—	4·2	4·0	2·6	2·6
Ash	—	—	—	1·26	1·29
Protein (N x 5·7)	11·1	10·7	11·1	11·3	10·9
	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.
Bushel weight	60	60½	63½	63	60½
Wholemeal fermentation test figure	28	28	—	35	31
	%	%	%	%	%
Flour yield	71·1	70·8	72·1	70·2	72·8

The protein and ash of each sample were calculated on wheat containing 10 per cent. moisture.

Flour.

	1933-34.	1934-35.	1935-36.	1936-37.	1937-38.
	%	%	%	%	%
Ash	0·44	0·44	0·45	0·41	0·44
Protein (N x 5·7)	9·2	8·3	9·1	9·4	9·2
Wet Gluten	24·2	23·8	27·3	28·1	26·3
Dry Gluten	8·6	8·1	9·0	9·7	9·2
Water absorption	56·0	56·0	56·0	56·8	57·0
Hydrated Maltose	1·36	1·70	1·55	1·50	2·42
Colour	Excellent	Excellent	Very good	Excellent	Very good
	Mls.	Mls.	Mls.	Mls.	Mls.
Standard loaf volume	437	425	442	510	445
	Grms.	Grms.	Grms.	Grms.	Grms.
Standard loaf weight	133·4	131·4	131·1	127·4	126·0

SUPPLEMENTARY BAKING TESTS.

	1936-37.	1937-38.
	Mls.	Mls.
Plus 0·5 per cent. malt, and 0·1 per cent. ammonium phosphate	545	500
Plus 0·5 per cent. malt, and 0·1 per cent. ammonium phosphate, and 0·001 per cent. potassium bromate	535	435

The flour results were calculated on flour containing 13·5 per cent. moisture.

The increase in the Maltose figure of this year's F.A.Q. wheat is no doubt due to the unusually wet weather experienced during the ripening period, but the general quality of the wheat, however, is equal to that of previous seasons.

State of South Australia

STOCKS OF WINE HELD AT 31ST DECEMBER, 1937.

Year.	Beverage Wine.		Wine for Distillation.	Grand Total.
	Fortified.	Unfortified.		
	Galls.	Galls.	Galls.	Galls.
1933	10,690,000	1,960,000	190,000	12,840,000
1934	10,750,000	1,740,000	235,000	12,725,000
1935	11,100,000	2,000,000	330,000	13,430,000
1936	12,250,000	2,030,000	150,000	14,430,000
1937	(a)13,400,000	1,850,000	400,000	15,650,000

(a) Includes 1,550,000galls. Duty Paid, and 11,850,000galls. In Bond.

Agricultural Bureau of South Australia

Yorke Peninsula Bureaux Conference

The South Kilkerran Branch was this year responsible for the organisation of the Annual Conference, which was held at Port Victoria, on 2nd March. All Branches on the Peninsula were represented. Messrs. A. J. A. Koch, W. E. Ford (Advisory Board of Agriculture), W. J. Spafford (Director of Agriculture), R. C. Scott (Chief Agricultural Adviser), C. McKenna, B.V.Sc. (Government Veterinary Officer), O. Bowden (District Agricultural Adviser), H. C. Pritchard (General Secretary), and F. C. Richards (Assistant Secretary of the Agricultural Bureau), attended on behalf of the Department of Agriculture. Mr. O. Heinrich presided, and Mr. Koch declared the Conference open.

The following papers were read and discussed:—"Building up the Farm Flock," Mr. R. E. Hastings (South Kilkerran); "The Reasons for Classing Wool," Mr. L. K. McKenzie (Brentwood); "Internal Ailments of the Horse," Mr. S. A. Brine (Arthurton); "The Care and Operation of Farm Machinery," Mr. W. A. Heinrich (South Kilkerran). Questions dealing with barley growing, introduction of noxious weeds, inoculation of seeds, stubble burning, and veterinary subjects were answered by Departmental officers.

Conference decided: "That the fertiliser companies be asked to take steps to eliminate weed seeds from sand that is added to superphosphate"; "That the Government be requested to introduce a Pure Seeds Act similar to that in operation in other countries, seeing that wheats are being introduced from other States and there is a grave danger of bringing in bad weeds"; "That the Yorke Peninsula Conference be arranged for the 3rd or 4th Wednesday in March"; "That the department consider the advisability of suggesting that the Roseworthy Agricultural College take up the matter of draw-bar pull of tractors offered for sale in this State"; "That Conference urge the Government to take steps to have noxious weeds destroyed on Crown Lands, and ask the district council to push the matter"; "That Government grant permission to commence stubble burning at 12 o'clock instead of 2 o'clock when agreed to by district councils"; "That the 1939 Conference be held at Brentwood."

At the evening session Mr. C. A. S. Hawker, M.H.R., gave an address illustrated with lantern slides.

Dairy Farm Competitions, 1937-38

Conservation of Fodder Section.—Adelaide Hills District.

Judged by R. Hill, District Agricultural Adviser.

Position.	Competitor.	Ensilage. 30.	Hay. 30.	Other Crops. 15.	Amount Conserved per Head of Livestock. 75.	Total. 150.
1	Irwin, J. M., Mount Barker	29	23	12	70	134
2	Farr, E. A., Meadows	28	26	7	72	133
3	Jackman, J. Rex, Paris Creek	28	20	13	65	126
4	Laing, R. J., Gumeracha	22	23	—	60	105
5	Sickerdick, A. A., Lobethal	—	26	12	60	98
6	Buckley, S. R., Lobethal	—	26	11	55	92
7	Peters, H. B., Mount Compass	—	25	12	50	87
8	Dunne, J. P., Bugle Ranges	—	28	13	45	86

Advisory Board

The monthly meeting of the Advisory Board of Agriculture was held at the Blackwood Experiment Orchard on 25th February, when there were present:—Messrs. S. Shepherd (Vice-Chairman) F. Coleman, H. N. Wicks, R. H. Martin, J. B. Murdoch, A. J. A. Koch, W. J. Spafford, W. E. Ford, and H. C. Pritchard (Secretary). Apologies were received from Sir Wallace Sandford, Mr. A. M. Dawkins, Prof. Perkins, Prof. Richardson, Hon. A. L. McEwin, M.L.C., Messrs. C. A. Loxton, and P. J. Baily.

New Member of Board.—Members welcomed Mr. W. E. Ford who had recently been appointed a new member of the Board by the Hon. Minister of Agriculture, in place of Mr. A. J. Cooke resigned.

New Members of Branches.—The following new members of branches were approved:—Balumbah—Walter Elliott; Boors Plains Women's—Miss Lois Harris; Coonawarra Women's—Mrs. R. Parson; Frayville—V. E. Wegener; Hanson—W. H. Lloyd, B. Scholz. C. Scholz, R. T. F. Rogers; Jamestown—F. Rice; Kalangadoo Women's Mrs. E. Walters; Keyneton—E. Rodgers; Light's Pass—R. Heidenriech; Maltee Women's—Mrs. R. Lovegrove, Miss E. R. Schwarz; Millicent Women's—Mrs, D. S. McCord, Miss J. Allen; Murray Bridge—L. H. Paull; Murraytown—E. J. Deer; Mypolonga—R. Llewellyn; Nelshaby—Hemsley Franks, Ray Jose, Dudley Roberts; Renmark North and Chaffey—Jack Twyford, Geo. H. Letton; Robe—R. Stuart, junr; Rosedale—H. A. Boomer, C. A. Gwynne; Spalding—A. Trengove, M. Trengove, M. Symonds, D. Gericke, Ellis V. Wilsdon, D. A. Campbell, Kingsley Page; Strathalbyn Women's—Mrs, E. Williams, Mrs. W. Langsford; Wasleys Women's—Mrs R. Currie, Miss H. Oliver.

Life Members.—The following names were added to the roll of Life Members of the Bureau:—Messrs. F. R. Dinning, E. Knowling, G. Evans and H. Warland (Mundalla), E. E. Richards (Narridy), D. P. Bagnell (Miltalie) and W. Saltmarsh (Currency Creek).

Advisory Council of Education.—The Secretary of the Advisory Council of Education advised that the appointment of members for this year had been delayed and, in view of Prof. Richardson's projected departure from South Austraia, suggested that another nominee of the Board be appointed. Decided to nominate Mr. W. J. Spafford as the Board's representative.

Members inspected the experimental work of the orchard under the supervision of Messrs. A. G. Strickland (Chief Horticulturist) and R. Fowler (Manager of the Orchard), and were afterwards entertained by Mr. and Mrs. Fowler, who were cordially thanked by the Vice-Chairman on behalf of members.

Various items were considered in Committee.

Maturity of Wheat.

Replying to questions relating to (1) the country that grows the earliest maturing wheats, (2) the shortest growing period on record of a crop from seeding to harvesting, and (3) the earliest variety of wheat grown in Australia, Mr. R. C. Scott (Chief Agricultural Adviser) said:—

"The earliest ripening varieties of wheat are found in China, Japan, India, and Australia. The time of planting has much influence on the growth period, but when seeded at the normal time, it is recorded that an early variety in China reached the full ear stage in 44 days, and was ripe in 74 days after germination. Under such conditions a variety could only give a light yield, and the best grain-yielding wheats take a long time to mature.

Climatic conditions force farmers to sow early wheats, and the earliest commercial varieties planted in Australia are Sunset, Noongaar, and Canberra. These are 14, 9, and 4 days earlier in reaching the full bloom stage than Early Gluyas.

Rainfall Table

The following figures, from data supplied by the Commonwealth Meteorological Department, show the rainfall of the subjoined stations for the month of February, 1938; also the average precipitation for February, and the average annual rainfall.

Station.	For Feb., 1938.	Av'ge. for Feb.	To end Feb. 1938.	Av'ge. Annual Rainfall.
Far North and Upper North.				
Oodnadatta	3·42	0·54	3·52	4·60
Marree	2·95	0·49	2·95	5·78
Farina	3·19	0·51	3·23	6·30
Copley	2·41	0·51	2·54	7·72
Beltana	1·41	0·66	1·58	8·34
Blinman	1·97	0·72	2·38	11·64
Hookina	1·39	0·45	2·20	10·85
Hawker	1·13	0·57	2·11	12·04
Wilson	1·55	0·63	2·65	11·63
Gordon	1·51	0·76	2·64	10·25
Quorn	4·53	0·60	5·36	13·02
Port Augusta	2·64	0·51	3·15	9·38
Bruce	1·75	0·58	2·40	9·78
Hammond	1·72	0·59	2·27	11·02
Wilmington	3·37	0·60	3·80	17·17
Willowie	1·50	0·71	1·59	12·07
Melrose	4·70	0·85	5·45	22·79
Booleroo Centre	2·01	0·65	2·65	15·08
Port Germein	1·93	0·51	2·30	12·49
Wirrabara	2·36	0·66	3·54	19·13
Appila	2·53	0·66	3·43	14·55
Cradock	1·90	0·65	3·28	10·62
Carrieton	1·57	0·57	4·23	12·06
Johnburg	1·22	0·53	2·69	10·47
Eurelia	2·72	0·61	3·99	12·61
Orroroo	1·73	0·63	4·80	13·10
Nackara	0·86	0·68	1·79	11·09
Black Rock	0·80	0·63	2·49	12·24
Oodlawirra	1·34	0·62	2·92	11·37
Peterborough	1·31	0·60	2·60	13·11
Yongala	1·64	0·67	2·88	14·37
North-East.				
Yunta	0·41	0·60	1·74	8·44
Waukaringa	1·45	0·50	2·25	7·85
Mannahill	0·43	0·67	0·98	8·06
Cockburn	0·26	0·57	0·32	7·85
Broken Hill	0·27	0·81	0·35	9·37
Lower North.				
Port Pirie	1·77	0·52	2·44	13·16
Port Broughton	2·47	0·53	3·21	13·82
Bute	1·51	0·52	2·14	15·36
Laura	1·97	0·69	2·78	17·88
Caltowie	2·89	0·69	3·45	16·65
Jamestown	3·57	0·65	4·17	17·63
Gladstone	2·69	0·61	3·31	16·24
Crystal Brook	2·84	0·62	3·47	15·72
Georgetown	3·60	0·71	4·26	18·17
Narridy	2·43	0·61	3·25	15·66
Red Hill	2·08	0·62	2·88	16·54
Spalding	1·94	0·78	3·43	18·51
Gulnare	2·03	0·77	3·54	18·37
Yacka	1·29	0·63	2·05	15·34
Koolunga	1·00	0·64	1·52	15·21
Snowtown	1·38	0·53	2·29	15·67
Lower North—*continued.*				
Brinkworth	1·10	0·66	1·57	15·60
Blyth	1·41	0·62	2·13	16·68
Clare	2·80	0·81	4·25	24·42
Mintaro	2·72	0·72	4·63	23·27
Watervale	2·98	0·77	4·41	26·66
Auburn	2·45	0·82	4·05	23·89
Hoyleton	1·21	0·55	3·01	17·27
Balaklava	1·04	0·56	1·64	15·34
Port Wakefield	0·52	0·63	1·34	12·90
Terowie	1·22	0·80	3·09	13·29
Whyte-Yarcowie	1·40	0·70	2·50	13·55
Hallett	2·39	0·70	3·96	16·37
Mount Bryan	2·52	0·80	3·74	16·74
Kooringa	2·20	0·69	3·76	17·75
Farrell's Flat	1·22	0·65	4·96	18·51
West of Murray Range.				
Manoora	1·80	0·62	3·83	18·87
Saddleworth	2·07	0·70	4·00	19·58
Marrabel	2·32	0·61	3·97	19·90
Riverton	1·65	0·67	3·06	20·80
Tarlee	1·50	0·63	2·73	18·06
Stockport	1·77	0·60	2·71	17·04
Hamley Bridge	1·07	0·63	1·82	16·50
Kapunda	1·74	0·69	3·90	19·71
Freeling	1·35	0·60	2·64	17·73
Greenock	2·54	0·69	4·21	21·42
Truro	1·55	0·67	2·75	19·72
Stockwell	1·61	0·71	3·09	19·98
Nuriootpa	2·30	0·66	4·24	20·77
Angaston	2·46	0·70	4·34	22·29
Tanunda	1·99	0·65	3·00	21·94
Lyndoch	2·25	0·67	2·99	23·17
Williamstown	2·28	0·69	3·06	27·41
Adelaide Plains				
Owen	1·34	0·71	2·25	14·83
Mallala	0·99	0·61	1·77	16·39
Roseworthy	2·03	0·56	3·17	17·37
Gawler	1·49	0·67	2·36	18·81
Two Wells	0·89	0·55	1·48	15·75
Virginia	1·37	0·58	2·02	17·17
Smithfield	1·93	0·70	2·49	17·62
Salisbury	2·25	0·62	2·81	18·49
Adelaide	2·45	0·72	3·06	21·17
Glen Osmond	2·21	0·69	2·84	25·84
Magill	2·46	0·78	3·37	25·24
Mount Lofty Ranges				
Teatree Gully	2·97	0·84	4·00	26·83
Stirling West	4·46	1·18	5·86	46·86
Uraidla	3·94	1·06	5·20	43·64
Clarendon	2·70	0·85	3·76	32·74
Happy Valley Res.	2·13	—	2·98	—
Morphett Vale	1·83	0·71	2·91	22·56
Noarlunga	2·20	0·68	3·47	20·35
Willunga	0·95	0·78	2·12	25·91
Aldinga	0·81	0·67	2·02	20·11

RAINFALL—*continued.*

Station.	For Feb., 1938.	Av'ge. for Feb.	To end Feb. 1938.	Av'ge. Annual Rainfall.
MOUNT LOFTY RANGES—*continued.*				
Myponga	1·79	1·05	2·94	29·45
Inman Valley	1·85	—	2·44	—
Yankalilla	1·39	0·75	1·81	22·70
Mount Compass	1·45	1·24	2·80	36·32
Mount Pleasant	1·85	0·76	2·60	27·02
Birdwood	1·85	0·70	2·36	28·86
Gumeracha	2·34	0·81	3·22	33·12
Millbrook Reservoir	3·20	1·02	4·23	34·00
Lobethal	2·54	0·87	3·35	35·79
Woodside	2·17	0·87	3·09	32·01
Hahndorf	2·43	0·84	3·23	34·65
Nairne	1·74	0·89	2·53	28·04
Mount Barker	2·13	0·90	2·99	31·17
Echunga	2·59	0·90	3·68	33·25
Macclesfield	1·64	0·88	2·44	30·29
Meadows	2·17	0·96	3·62	35·93
Strathalbyn	1·05	0·72	1·97	19·35
MURRAY FLATS AND VALLEY.				
Meningie	1·39	0·60	2·63	18·28
Milang	1·27	0·56	1·92	14·85
Langhorne's Creek	1·29	0·60	1·96	14·99
Wellington	1·01	0·58	1·53	14·68
Tailem Bend	1·27	0·77	1·97	15·19
Murray Bridge	0·78	0·58	1·20	13·51
Callington	0·80	0·56	1·05	15·14
Mannum	0·80	0·49	1·54	11·51
Palmer	1·04	0·65	1·60	15·70
Sedan	0·75	0·53	1·67	11·99
Swan Reach	1·31	0·69	2·01	10·60
Blanchetown	1·03	0·55	1·95	10·97
Eudunda	2·30	0·65	4·08	17·16
Point Pass	1·99	0·58	3·30	16·93
Sutherlands	0·99	0·50	1·82	10·73
Morgan	0·59	0·55	1·54	9·12
Waikerie	0·40	0·93	1·31	9·71
Overland Corner	0·39	0·64	1·87	10·21
Loxton	0·45	0·90	1·91	11·34
Berri	0·56	0·83	2·16	10·11
Renmark	0·35	0·73	1·37	10·37
WEST OF SPENCER'S GULF.				
Eucla	0·35	0·66	0·83	10·06
Nullarbor	0·11	0·46	0·51	8·79
Fowler's Bay	0·99	0·48	1·53	11·89
Penong	2·57	0·68	2·80	12·22
Koonibba	5·25	0·80	5·54	12·16
Denial Bay	4·30	0·61	4·40	11·31
Ceduna	4·73	0·56	4·91	10·30
Smoky Bay	4·02	0·50	4·52	10·42
Wirrulla	7·26	0·43	7·39	10·71
Streaky Bay	5·23	0·48	5·50	14·85
Chandada	6·30	0·33	6·56	12·31
Minnipa	6·56	0·76	6·88	13·83
Kyancutta	4·06	0·65	4·37	13·16
Talia	5·09	0·40	5·36	14·50
Port Elliston	4·86	0·43	5·19	16·44
Lock	5·03	0·73	5·33	16·23
Mount Hope	3·50	—	3·81	—
Yeelanna	4·00	0·48	4·26	15·92
Cummins	4·09	0·56	4·55	17·47
Port Lincoln	3·77	0·51	4·08	19·27
Tumby	3·76	0·54	4·09	14·16
Ungarra	3·05	0·71	3·21	16·81
Port Neill	3·28	0·73	3·44	13·06

Station.	For Feb., 1938.	Av'ge. for Feb.	To end Feb. 1938.	Av'ge. Annual Rainfall.
WEST OF SPENCER'S GULF—*continued.*				
Arno Bay	2·48	0·65	2·71	12·72
Rudall	3·42	0·70	3·63	12·94
Cleve	3·62	0·67	4·00	14·90
Cowell	1·49	0·62	1·99	11·06
Miltalie	3·30	0·65	4·00	13·72
Mangalo	2·59	0·77	3·39	13·80
Darke's Peak	2·86	0·76	3·44	15·08
Kimba	2·70	0·83	3·38	11·64
YORKE PENINSULA.				
Wallaroo	2·14	0·52	3·62	13·93
Kadina	2·12	0·52	3·61	15·53
Moonta	2·32	0·53	3·51	14·98
Paskeville	1·72	0·48	2·51	15·47
Maitland	3·00	0·64	4·01	19·76
Ardrossan	1·23	0·48	1·71	13·91
Port Victoria	1·96	0·50	2·58	15·33
Curramulka	0·95	0·51	1·50	17·72
Minlaton	1·37	0·49	1·90	17·65
Port Vincent	1·06	0·58	1·29	14·26
Brentwood	1·55	0·53	1·92	15·52
Stansbury	1·34	0·49	1·62	16·75
Warooka	2·15	0·53	2·85	17·38
Yorketown	1·61	0·49	2·10	16·81
Edithburgh	1·63	0·53	2·33	16·31
SOUTH AND SOUTH-EAST.				
Cape Borda	4·23	0·62	4·72	24·83
Kingscote	2·36	0·58	2·44	19·20
Penneshaw	1·54	0·73	1·69	19·09
Victor Harbour	1·62	0·71	2·35	21·37
Port Elliot	1·46	0·71	2·43	19·93
Goolwa	1·63	0·68	2·85	17·85
Maggea	1·14	0·57	1·94	10·32
Copeville	0·66	0·73	2·61	11·64
Claypans	1·14	0·60	1·69	10·77
Meribah	0·39	0·64	1·42	11·26
Alawoona	0·41	0·61	1·50	10·43
Caliph	0·62	0·41	1·46	10·60
Mindarie	0·80	0·62	1·46	12·16
Sandalwood	0·93	0·67	2·01	13·67
Karoonda	1·16	0·77	1·75	14·33
Pinnaroo	1·10	0·91	1·98	14·14
Parilla	1·16	0·70	2·39	13·67
Lameroo	1·99	0·77	2·69	15·79
Parrakie	1·39	0·72	1·65	14·58
Geranium	1·43	0·71	1·91	16·36
Peake	1·15	0·83	1·69	15·87
Cooke's Plains	1·46	0·63	2·21	15·33
Coomandook	1·12	0·65	1·72	17·01
Coonalpyn	1·19	0·62	2·01	17·65
Tintinara	1·09	0·79	1·94	18·68
Keith	1·28	0·90	2·74	17·95
Bordertown	2·21	0·76	2·78	19·16
Wolseley	1·77	0·74	2·29	18·50
Frances	2·89	0·76	3·84	20·18
Naracoorte	2·40	0·73	3·72	22·64
Penola	1·83	0·85	3·02	25·89
Lucindale	1·71	0·67	3·36	23·48
Kingston	0·97	0·68	1·54	24·24
Robe	0·69	0·73	1·02	24·63
Beachport	0·92	0·88	1·89	27·06
Millicent	1·84	1·01	2·73	29·93
Kalangadoo	2·95	1·34	4·72	32·00
Mount Gambier	2·05	1·04	2·87	30·29

Agricultural Bureau of South Australia

Papers Read at Conferences

Concrete on the Farm

[COL. E. T. DEAN, Keyneton (Lyndoch Conference).]

To-day the progressive farmer recognises the economy and lasting satisfaction of making permanent improvements to his property. In concrete, he has the most valuable and plastic building material to use in securing such conditions. It is strong, will withstand years of service without requiring replacement, repairs, or any upkeep costs whatever. It insures sanitary conditions wherever used, and has the recommendation of all health authorities everywhere.

Concrete construction modernises the farm, saves a great deal of work, and provides many conveniences which the farm of 20 years ago could not boast. Concrete construction is not expensive, and is in many cases as cheap in its first cost as other construction of less value. With all these qualities, it is surprising that its use is not more generally applied to farm construction than it is.

What is Concrete?

Concrete is a product resulting from the proper mixture of cement, sand, stone or gravel and water. The cement acts as a mineral glue, binding these materials firmly together. Many people believe that the quality of the concrete depends entirely upon the cement used. It is true that a high grade cement must be used, but of equal importance is the selection of the other materials and the care exercised in their mixing. Good concrete can be made by following these 5 simple rules:—

1. Use good cement.
2. Use clean, well-graded sand and stone.
3. Mix properly and completely.
4. Place carefully.
5. Use care while curing.

Ingredients.

Sand, gravel and stone vary in quality and must be selected with care. Sand is often dirty, due to the presence of foreign materials, such as silt or organic matter. Rotted vegetable material may be present in such a fine form as to be difficult to detect, or considerable clay may be in the sand. Practically the same impurities may be found in gravel or crushed stone, particularly in gravel. The pebbles may be coated with clay and foreign material, which will prevent the cement from binding the mixture firmly together as a mass.

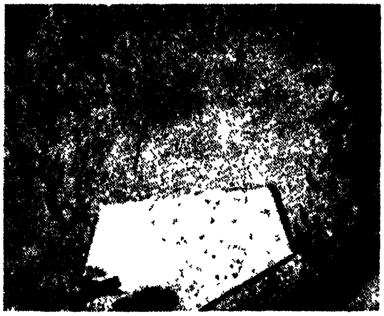
A concrete mixture in which there is not sufficient cement-sand mortar to fill spaces between coarse aggregate. Such a mixture will be hard to work and will result in rough, honey-combed surface.

Practically every gravel bank contains more sand than pebbles; in fact, the case is usually the reverse of what is best in making good concrete. It is therefore necessary that a ¼in. sieve be used to separate the sand from the gravel. By so doing, the proportions can be quickly gauged to conform to the requirements of the work at hand.

A very simple test to ascertain if sand is free from silt or earth is made by placing 2in. of sand in a bottle filled with water, shake thoroughly for a few minutes, then allow to settle for 24 hours. If, after settling there is one-eighth of an inch or more of sediment above the sand, washing is desirable, or discard the sand altogether.

The usual proportions of concrete mixtures required are approximately twice as much gravel as sand. In concrete work, material that will pass through a ¼in. screen is called sand. Material that will not pass through it is called gravel. If this screening is done, a satisfactory material can be made up for the average farm job.

Within reasonable limits, the strength of the concrete increases with the size of the stone or gravel. In the general run of concrete work, including thin re-inforced sections, the size should not exceed 1in. or 1½in. In mass concrete, such as heavy foundations and thick walls or floors, the size of the stone or gravel may often range up to 2½in. or even 3in. Round or egg-shaped particles of stone or gravel pack more closely and produce better concrete than flat, elongated pieces. Concrete when mixed is a quaky mass, and unless being placed in trenches for foundations or for floors, it must be placed in some kind of forms of the correct shape and size, so that when it has set the desired results may be obtained. It pays to use care in making and setting up these forms, because the appearance of the finished work is governed by the care with which they are made.



A concrete mixture which contains correct amount of cement sand mortar. With light trowelling all spaces between coarse aggregate are filed with mortar. Note appearance on edge of pile. This is a good workable mixture and will give maximum of concrete with a given amount of cement.

When nailing forms together, do not drive the nails home, as it facilitates their easy removal when taking to pieces. There cannot be any set rule for the removal of these forms, but under normal conditions, forms can be removed after two days. It is much better, whenever possible, to allow them to remain much longer, as they assist materially in the proper curing and strengthening of the concrete.

To prevent concrete from sticking to the forms or moulds, saturate them with oil. Oil drained from the crankcase of motors is very useful for this purpose.

Re-inforcement is needed for concrete subjected to strains other than those of compression. The compressive strength of concrete is approximately 10 times its tensile strength. Re-inforcing metal of suitable size and shape, properly embedded in the concrete, will provide the necessary tensile strength for beams, overhead floors, walls, tanks, silos, posts or any other structures which are to carry loads.

Concrete properly mixed and well placed adheres to steel and forms a firm bond. When loads are applied, the steel immediately takes its share of the strain. Re-inforcing should be free from rust, grease or any other foreign substance that will prevent the concrete from adhering to it All rust in the form of dust, and particularly scale, should be removed with a wire brush. The bending of reinforcements should be done gradually, in order that its strength will not be impaired by small fractures. Old wire, which is usually crystallized, should be heated before being bent. Reinforcements should be so placed that they will take the full tensile strain that is required of them.

A concrete mixture in which there is an excess of cement-sand mortar. While such a mixture is plastic and workable and will produce smooth surfaces, the yield of concrete will be low. Such concrete is also likely to be porous.

Steel is used instead of other metal for re-inforcing concrete because it has practically the same ratio of expansion and contraction as concrete. In other words, all substances expand and contract under changing temperature conditions, and the rate of expansion in steel and concrete is so nearly the same that the bond between the concrete and steel is not broken.

Proportioning Concrete.

Concrete mixtures are specified as 1 : 2 : 3. These figures represent the volume of each of the three materials used, always in the following order:—Cement, sand, stone. Thus a 1 : 2 : 3 mixture would be 1 bag cement (which contains 1 cubic ft.), 2 cubic ft. of sand and 3 cubic ft. of gravel or stone. A mixture of 1 : 2 : 3 gives a very dense, strong and waterproof concrete, suitable for tanks, posts of all kinds, water troughs and all work subjected to unusual stress, wear or moisture exposure. A 1 : 2 : 4 mixture concrete is of quite high strength and waterproofness. The mixture 1 : 2½ : 4 concrete will be found easy to work and to place in the forms, and it does not leave as many rock pockets against the wall as is usual with a mixture that contains less sand. Its strength will be found very nearly that of a 1 : 2 : 3 mixture, and for paths, stable or cow byre floors and similar work, it is excellent, and will finish nicely without the addition of any mortar or granolithic surface is obtained with a minimum of labour and material.

A mix of 1 : 2½ : 5 is suitable for footings and walls thicker than 6in. Any mix in which the cement proportion is lower than this can be used only where mass and not strength or watertightness is required.

Mixing Concrete.

Where concrete is to be mixed by hand, a watertight platform should be made and used, as it saves waste and keeps all materials clean. Measure sufficient sand for one batch, and spread on platform, then spread the cement as evenly as possible over it; then measure the desired stone and spread over the other two; mix all the materials thoroughly by turning several times with a shovel, until all streaks of brown and gray disappear and the colour is uniform. Make a hollow in the centre of the heap and add water, mixing until the desired consistency is obtained.

Avoid using too much water in mixing; excess water weakens concrete. The concrete should always be wet enough to bring water to the surface with moderate spading. A quaking or jelly-like mass is preferable wherever it can be used. Always remember the more one works concrete the stronger the finished article becomes.

Placing Concrete.

Concrete commences to harden very shortly after water is added, and should be placed in the forms as soon after mixing as possible, in order that it may assume the shape intended. When placing concrete in the forms, it should be so worked or rammed to exclude all air pockets, and to bring the finer part of the mixture to the outside, which will of course leave a smoother finish, especially where it is not desired to plaster afterwards.

For all work where a non-slip surface is desired, such as floors and steps, the concrete should be finished with a wooden float, which will give a slightly rough finish; this is particularly advisable in stables and dairies. Water tanks, troughing, &c. should be finished with a steel trowel: the smooth, hard finish is also more impervious to water.

Curing Concrete.

The hardening of concrete is not a drying process. It is a combination of water and cement which causes concrete to harden. Forms are often taken down and work exposed to wind and sun in the belief that such treatment is an aid to hardening. This practice deprives the concrete of a great deal of added strength that proper protection would have given it. Exposure to drying influences weakens concrete structurally, and would deprive concrete floors, walls and other work of strength that would increase wear resistance. Keeping concrete damp the first 10 days will give 65 per cent. increased strength and hardness; 3 weeks protection will give a still greater strength.

Appended are suggested proportions for the following:—

	Mixture.	Maximum size of stone in inches.
Construction subject to water pressure, reservoirs, tanks, watertroughs	1:2:3	1
Fencing posts of all types, reinforced, well covers, reinforced	1:2:3	¾
Well linings	1:2:3	1
Foundations for engines subjected to heavy loads, impact and vibration ..	1:2:4	2
Concrete roods, pavements, steps, walls above foundations, concrete floors of all kinds	1:2½:4	1½
Foundations for small engines	1:2½:5	2
Mass concrete, large retaining walls, heavy foundations and footings ..	1:3:6	3

When once concrete has been given a trial and the user realises with what facility it can be handled, and comes to appreciate its full value as a constructional material, nothing is more certain than that it will be adopted for many purposes.

The adaptability and enduring qualities of concrete render it pre-eminently and particularly suitable for the construction of all farm improvements, especially as most farmers have most of the material required either on the place or near at hand. The only cost, in most cases, would be the cement, as most of the work can be done in wet weather or in spare time, which reduces the labour cost to practically nil.

Pig Raising

[J. Mellors, Rosedale (Lyndoch Conference).]

Primary producers and farmers alike are now beginning to realise that pig raising (a once neglected sideline) is progressing rapidly, owing to the marked increase in the demand for pork and bacon, not only for local consumption, but also for the overseas market. Certainly the markets and prices have been subjected to sudden variations; at times the producer has received very little for his trouble, but with the improvement of economic conditions, pork and bacon prices are on the upward trend.

There are various ways by which pigs are raised, depending mainly on the time and attention the farmer can give them. 1. The man who keeps pigs on a large scale, *i.e.* allotting paddocks of peas, barley and other fodders and allowing the pigs to graze the crops. 2. The dairy farmer who feeds his pigs on separated milk in conjunction with crushed grain. This is probably the most popular way of raising pigs for market in South Australia. 3. The man who is situated near the town and is able to procure the feed for his pigs from neighbouring butter factories, cheese factories, fruit shops, etc.

Type of Pigs Popular Among Breeders.

When selecting the type or breed of pig, the breeder should be guided more or less by market requirements. It should be the farmer's aim to breed the pig which is a good seller. Popular breeds are:—1. Large White is a good type of pig, popular with breeders to-day; a tall lengthy pig, and a vigorous grower. 2. The Tamworth. Tamworths are also hardy pigs, and produce fine pork and bacon, finding favour with many breeders. 3. Mid York is also a fine pig, but not quite so good as the two abovementioned types. Many farmers are crossbreeding the Mid York and the Large White, thereby producing a fine type of pig. 4. The Berkshire; at one time a popular breed, is gradually being displaced by other breeds.

The Sty.

When building the sty the methods of drainage should be first considered. A gentle slope is an ideal building site. Whether of stone, iron or straw, the shed should have a concrete or brick floor, as well as the necessary drain to take away dirt, etc., which would otherwise accumulate in the sties, causing them to become unhealthy. The sow's sty should be constructed somewhat different to the fattening pens. Rails be placed on the inside of the sty at about 9in. from the floor and at the same distance from the walls, the rails running parallel with floor and walls. This prevents the sow from rolling on her young. A small shelter can also be built in the paddock or the large run. This can be used by sows who have finished rearing their young; after this period, they need plenty of exercise. After the erection of the sties, care should be taken to see that they are well drained and cleaned frequently.

The Boar.

Success in pigbreeding depends largely on the type of boar a breeder selects. If possible, select a young boar from a pedigreed sow. Ascertain the sow's good points and her power to breed good and even-sized litters. Having selected a vigorous and well-bred boar, see that he is well fed and cared for, housing him only in a clean sty. At 9 or 10 months old the boar will be fit for service. He should be permitted to serve not more than 5 or 6 sows for the coming year; after that period the number of sows can be increased.

The Sow and Litter.

When choosing the sow, points relating to its parents should be considered, similarly to those of the boar's parents. The sow must be well formed, with 14 distinct teats. A sow which has a tendency to fatten quickly should not be used for breeding purposes. At 10 to 13 months old the sow can be mated with the boar. After service, the sow can be turned into the paddock or run for exercise. It is not wise to overfeed and fatten the sow for the following 3 months. About 3 weeks before the sow is due to farrow she can be brought into the specially prepared sty and and given the necessary food enabling her to produce enough milk for her young. Foods such as bran and skim milk and a little crushed grain help to produce milk; also a little green feed or ensilage is advised. About a day or two before the sow is due to farrow, the sty should be thoroughly cleaned and disinfected, and a layer of clean straw spread over the floor. Take care that the straw is not too thick, as there is a likelihood of the piglets becoming buried and rolled upon. After farrowing, remove all traces of afterbirth, &c. and replace with a little clean straw. The sow can then be given a warm bran mash, with a handful of salt mixed in. From then on the sow should be given milk producing foods, and with proper attention and care, she should rear healthy pigs.

When the young pigs are about 3 weeks old, the boars should be taken out and castrated. Care should be taken with this operation; instruments should be thoroughly sterilised and disinfected as a preventive against dirt entering the wound. At weaning time they will have completely recovered.

When the pigs are from 6 to 7 weeks old, they can be taken from the mother and placed in the fattening pens. See that sties are not overcrowded. The sow's feed should be immediately decreased until she has lost all her milk.

Feeding.

Feeding pigs on the majority of dairy farms is somewhat similar. With the aid of the skim or separator milk and plenty of crushed, soaked wheat or barley, the young pigs are very soon brought to the stage of porkers. Baconers, however, must be kept longer, and their grain ration increased. Do not feed whole grain, because the pigs derive little or no benefit from this manner of feeding. Feeding the sow should be carried out along the lines mentioned above, the milk-producing foods being crushed and soaked oats, bran and linseed meal, also plenty of greenfeed or ensilage, the latter for medicinal purposes. When a pig breeder is connected with the distribution of whole milk, the system of feeding has to be somewhat altered, owing to the lack of separator milk during the dry period of the year. The crushed cereal diet must be increased and fresh water given instead of skim milk. All pigs should be given minerals, just as the dairyman would give his cows. In whatever way the pigs are fed, it is essential to adopt the best method, and that is, little and often.

Internal Ailments of the Horse and Their Symptoms

[S. A. BRINE, Arthurton (Yorke Peninsula Conference, Port Victoria).]

As these complaints are many in number, and would require much space and time to deal with separately, it has been decided to deal with the more common and frequent ailments that befall the horse which the average farmer may learn to understand and judge for himself.

Spasmodic Colic.

A disease well known to every horse-owner, is of very frequent occurrence, and almost every farmer is familiar with the symptoms which accompany it. Spasmodic Colic is a violent pain from spasm contraction and cramp of one or many portions of the muscular coat of the bowels. It is called spasmodic on account of the pain and cramp being spasmodic and not continuous. There are moments of relief from pain in which the animal will be quite at ease, but it will continue to return at intervals. The chief cause of this trouble is ravenous eating and drinking; in others it is from irritants of the bowels, such as worms, and also from drinking too large a quantity of cold water when the animal is very hot. The first symptom of this disease is that the horse becomes uneasy, stops feeding, continues to look from side to side, continues to paw and raise his hind feet towards his stomach, steps about from place to place, and finally will curl himself with the idea of wanting to lie down. This may go on for quite a while, when eventually the animal goes down, which is the beginning of the second stage; his movement then is up and down at intervals of every two minutes or so. The third stage is recognised when the horse begins to fight, rolls continuously, throws himself down roughly, sweats, and finally turns upon his back and remains for quite a time in that position. It is in this position only that he will eventually draw three legs towards the stomach, and one, usually the left, will be seen pointing in the air. This follows naturally, and these are considered to be the true and correct symptoms of Spasmodic Colic.

Flatulent Colic.

This is sometimes thought to be the third stage in Spasmodic Colic, but the writer claims at the outset no relationship between these two complaints. The nature of this disease is acute indigestion, a condition very different from Spasmodic Colic, and is much more difficult to treat. It is due to fermentation brought about by weak digestion, or suspension of digestion entirely, which allows the undigested food to decompose, and while undergoing that process, fermentation sets up, gas is evolved, and the horse bloats up. This trouble is more likely to take place with very young or rather old horses when being fed on solid food, more particularly food lacking substance, and it is still more prone when animals are grazing in stubble paddocks. When food is insufficiently digested and remains in the stomach longer than its natural passing out period, it decomposes, and in doing so, sets up a fermentation of gas, which is known as Flatulent Colic. Pain at the outset of the trouble is not as intense as that of Spasmodic Colic, but deepens during advancement. One of the characteristic symptoms is the bloating of gas. The trouble gives place to a certain amount of rolling and kicking; the horse tries to lie on his back, is continuously up and down, sweats, has a haggard look, sits on his haunches like a dog, with the top lip turned up, and will, as the trouble advances, try to vomit through the mouth and nostrils; but owing to the peculiar formation of the stomach, a horse cannot vomit, so to speak, the gas distends or causes distension to such an extent that the stomach and bowels are forced on to the lungs to such an extent that suffocation is the result. In cases where an animal lingers with this complaint, it usually dies from rupture, the bursting of the colon or the diaphragm; and it is quite natural to expect a slight variation in the attack and also the death of the horse. Two horses from one man's stable need not necessarily die in the same manner, for one may die standing, the other lying down, which is accounted for in this respect:—Flatulent Colic causes a strain on the muscles of the horse, and tightens to such an extent that it causes him cramp around the chest, shoulders, and neck, which almost forces him to the ground for relief, and usually he dies on the ground. The other will endeavour to resist the muscle strain, and for hours prior to death he will not lie down but will die standing. The description of death in this respect is easier to account for than in the case of the horse that dies on the ground. If, however, after prolonged standing he reels and falls forward, it is due to the bursting of the diaphragm. If he sways and the hind quarters fall first, that necessarily follows the bursting of the colon.

Inflammation of the Bowels.

This is a very serious condition, and one that will prove fatal unless promptly and skilfully handled. There are two kinds of inflammation—one known as Enteritis, which is the inner lining of the large intestines, and which can be brought about either by irritating substances in the food, catching cold which settles in the bowels, continuation of Colic, either Spasmodic or Flatulent, and also by poisonous herbage. The symptoms are that the animal shows distinct signs of Colic pains; he lies and rises just as he does with Colic, although the pain is light at first but increases as the inflammation develops. There is this difference between Enteritis and Colic (for which it might be taken by the ordinary observer); with Enteritis the pain is continuous, in Colic it is intermittent. In Colic the horse throws himself down, in Enteritis he lies down carefully, the breathing is hurried, there is a rapid beating of the pulse, constant desire to move about, and continually looking round at the sides. While all this is going on, there will be seen an occasional pellet or so dropping, which to some extent is dark-brown in colour and covered with a white slimy fluid. The mouth is usually found to be hot and dry. A further proof of this complaint will be found in post mortem examination, which shows the bowel affected to be almost black from inflammation and mortification. This disease usually confines itself to about a yard of the stomach, and the tissue of the intestine will be swollen sometimes over an inch thick.

Peritonitis.

This is the second kind of inflammation of the bowels, and is a disease that the farmer is not likely to identify unless he is a very observant person. Fortunately it is not of a very frequent occurrence. It is known as inflammation of the outer covering of the bowel or of the inside lining of the abdomen. Pain is excessive (which no soothing medicines seem to ease); there is a great deal of body stiffness and the horse grunts when turned round sharply or made to move. The stomach is usually tucked and the abdominal walls rigid; there is great tenderness upon pressure of the stomach, and effusion of water takes place in the belly. The pulse is rapid, and the horse generally has a very anxious expression. He will be seen to lie down very easily, but get up quickly. Peritonitis is usually a complication of other complaints. It can also arise from chills through exposure to cold, bleak weather, or perhaps from abdominal wounds or bruises from kicks or injury of the stomach. Post mortem examination further reveals extensive discolouration of the bowels and surrounding tissues. The intestines will be very much swollen, and a large quantity of blood-stained water or fluid will be found in the stomach cavity.

Stoppage of the Bowels.

This is quite a common complaint among hard-working and well-fed horses. Usually it is not a fatal disease if the proper treatment for it is undertaken without delay. It is often caused by improper mastication of food, insufficient water; or it may follow an attack of scouring. Symptoms are dullness, loss of appetite, and a disposition to lie, very little if any pain, and no fever at the outset. As time goes on, the horse continues to lie the more and will often be found lying flat on his side with his head on the ground. He may lie in this position for half an hour at a time, and will be seen at intervals to raise the head and look over the shoulder towards the flank. He may then get up, walk a little with the head dropped, and then lie down again. This case may vary, for the writer has seen cases where the animal will stand more than it lies, and will be seen at intervals to strain as if trying to pass water, but little or none comes. In some cases he does it so often that the owner is lead to believe that the horse is suffering from stoppage of water or kidney trouble. This straining is due to pressure on the bladder by an over-loaded loop of bowel, and a farmer who has any doubt on this point can easily satisfy himself by soaping or oiling the arm and exploring in the rectum. He will have no difficulty in feeling a great mass of doughy material lying right over the bladder, and it has a tendency to squeeze that organ flat, which irritates the horse considerably; thus he strains to seek relief. There is very little pain in this disease, and no fever at the outset.

Gastritis.

A complaint which is sometimes met with in cases where a horse will get an overloaded stomach of rank greenfeed, such as clover or other bulky green fodder growing in abundance. In this case there is a tendency to Wind Colic; the food not being digested rapidly enough, decomposes, and its gasses quickly lead to founder. In the attack there is usually loss of appetite, and a good deal of turning up of the top lip. There are many other bowel troubles, such as constipation, diarrhoea, dysentery, bowel loop, stomach worms, staggers, indigestion, tumours, and other various obstructions.

The horse, like all domestic animals, has its turn of lung trouble, and the lungs can be attacked in various ways. Catarrh is the outcome of a common cold confined to the nose, which is quite simple in itself if checked in time, but if neglected, it causes inflammation of the mucous membrane of the nostrils, and often extends to the sinuses of the head, especially the frontal sinuse situated between the eyes. Therefore all inflammations of the upper air-passages are liable to run down into the lungs and cause Bronchitis and Pneumonia, which are always serious. The trouble referred to is often brought about by exposure to cold winds and rain when not in a fit condition to resist the attack. The symptoms are that there is always a discharge from one or both nostrils, which in its first stage is of a thin, white watery, and somewhat frothy nature, but as it advances it thickens and is of a yellow nature with an offensive odour. In bad cases there is considerable fever, loss of appetite, and redness of the eyes. If further neglected, and Nature is not vigorous enough to throw it off, it becomes chronic, and other complications follow. There is also Laryngitis and Quinsey. Both of these are throat troubles, and if neglected can have a serious effect on the lungs.

Bronchitis.

This complaint is known as inflammation of the lining of the bronchial tubes, which are the small tubes that lead the air from the windpipe into the lungs. There is a very great tendency in the horse to inflammation of the upper air passages, which run down upon the lungs; so much so that many cases of Catarrh and Laryngitis terminate in Bronchitis and Pneumonia. The trouble is always ushered in with a shivering fit, but this fit is seldom seen, and if seen is thought nothing of by most farmers. Thus the chill passes off and the reaction brings fever; there is an increase in the pulse and temperature, breathing is hurried, and the nostrils distended. If pressure is applied to the chest just above the breastbone, pain will be evinced and a cough provoked, which is soft, deep, and subdued, great pain being manifested while coughing. The horse is loath to move; if the ear is placed to the nostrils a grunt will be heard with each breath, and if the ear is placed in front of the chest a thick, unnatural sound will be heard; the ears and legs are usually cold, the appetite somewhat indifferent and in most cases entirely lost; the horse persistently stands and drinks considerable water. All of these are natural symptoms of an attack of Bronchitis.

Pneumonia.

Pneumonia—another lung disease—is probably best known as inflammation of the lungs. It really consists of inflammation of the lung substance or the lung tissues as it were, not including the lung covering or the air tubes. Pneumonia is certainly less common in the horse than Bronchitis, although it may occur from different avenues, such as chills or extension of inflammation from other organs. It may occur as a complication of fever disorders, such as influenza. It can be caused also, and not infrequently, by drugs intended to reach the stomach finding their way into the lungs instead. This is most likely to happen when medicine is poured into the animal's nostrils, a practice that should never be indulged in. Symptoms:—The first stage of this trouble is shivering, heavy breathing, stiffness, high fever, increased pulse, hot breath, tucked-up belly, ears and feet are cold; the pink membrane lining of the nostrils is of a bluer tint than normal. On the ear being applied to the sides of the animal a dry grating sound will be heard; the urine usually scanty and highly coloured; the horse persistently stands; although to all appearances he is weak, he will not lie down. If he moves at all it will be towards a chink in the wall or a hole in the door from which he seems to drink in draughts of cool air. As the disease advances, he turns out his elbows, evidently with the object of increasing his chest capacity. One thing to bear in mind when suspecting this disease is not to expect the patient to cough, for there is very little cough, and in most cases none at all at the early stages. In this it differs from Bronchitis.

Pleurisy.

Another lung disease, consisting of inflammation of the thin, delicate membrane which lines the chest walls and covers the lungs. This also is not so very common among horses, and it is difficult to distinguish from Pneumonia in the early stages. It can be brought about by sudden exposure to cold winds and rain, draughts in the stable, especially if the horse comes in warm, and extension of inflammation from the lungs. Symptoms:—Chills followed by high fever, stiffness of the forequarters; the ribs are fixed and breathing is carried on chiefly by the assistance of the abdominal muscles; there is a dry, suppressed cough, as if coughing caused great pain. The animal does not die down, and if he is turned sharply around he grunts, indicating that the sides are sore. Great pain is evinced upon pressure of the fingers between the ribs; also there is the grating sound heard by the ear being applied to the sides, which is made by the rubbing of parts internally that are rendered dry by the inflammation. If the trouble lasts long, effusion takes place, and the chest will begin to fill with water, which usually brings on founder.

Influenza.

This is a name given to a blood disease in horses that is peculiar in many ways. It is a blood disease in that it is caused by the introduction into the system of a poison that has its origin in the atmosphere and cannot be isolated. It is supposed to be of a malarious nature, due to influences very extended in character. This disease can also have a very serious effect upon the lungs. It can also leave a horse with a chronic cough and weakened system from which it never really recovers. The first symptoms noticed in this trouble are dullness in harness, weakness, sweating easily; the horse continues to hang his head, the ears droop, the appetite fails, the eyes become very red, the pulse very quick, high temperature, swollen eyelids, and as it advances, there is to some extent, colicky pains and constipation. The legs will at times swell considerably and become very sore to the touch. The mouth becomes very hot, the whole surface of the body becomes very hot to the touch, and as time advances, all the symptoms become more severe. For instance, the eyes discharge to such an extent that it will scald the hair from the cheeks, the discharge from the nostrils thickens and sticks around the nose with an offensive odour, and the legs become sorer. The bowels may either become very loose and diarrhoea sets in, or they may become stubbornly constipated; either attack will probably cause inflammation of the bowels, the urine scanty and highly coloured. The fever may travel to the brain; the lungs also may take on an inflammatory condition and run into Pneumonia. Horses with Influenza lie down a great deal at first, and will continue to do so unless the lungs become affected. Although Influenza may not be regarded as a very serious complaint by many people, yet it is capable of creating a greater complication of attacks than almost any other ailment known to veterinary science, and will certainly rob a horse of his condition most unaccountably fast.

Building up the Flock

[R. E. Hasting (South Kilkerran).]

In order to bring a flock quickly to as near perfection as is attainable, the first essential is to begin with the highest class of sheep possible. If this cannot be done, endeavour to start with a useful lot, large-framed and well covered with wool. Having found the right type keep to it: improving it by degrees is far better than changing about. Every district has its type, and with careful culling and classing, however faulty a flock may be, it can be improved vastly, both in covering and formation. Gradually the flock can be improved by carefully selecting the best of the younger ewes for breeding. Breed for the largest frame possible for the district, and at the same time have that frame covering packed with wool; but as well as density, length and character are necessary.

Character is denoted by crimp, and crimp is the undulation or wave seen on the wool fibre or staple. Therefore, breeders should always try to raise sheep that will give wool nicely crimped from butt to tip. Also it should be even in type and quality. The wool on the breech portion should not vary to any extent from that on the shoulder and rib. The more crimps to the inch the finer the wool. If there is any marked difference in quality between wool grown on the shoulder and that produced on the breech, the fleece is not even in quality. The necessity for evenness should be borne in mind when a ram is being purchased. There are bound to be faults in type and quality in the wool of many ewes in a flock, and in order to minimise the defect in the progeny, a sire as near faultless in this respect as possible should be obtained.

The first essential in a sheep is constitution, which is indicated by the animal being strong and robust-looking, with body long and level on the top, good depth at girth, well sprung ribs, wide and deep at the chest, legs well apart, and the body set fair and square on them. Sheep showing these points will almost certainly be "good doers," and when a sheep is healthy it is capable of rearing a healthy lamb and producing a healthy type of wool and plenty of it. Size is often overlooked; on no account should this be lost sight of. For Merino sheep, aim at big, well-shaped, evenly-covered animals, free from body wrinkles, and any trace of kemp or hair, and at the same time well woolled down to all points.

The mouth should be frequently examined, and if failing, the ewe should be culled. As a rule when a ewe is becoming aged, her wool-producing properties begin to fail. The whole secret of breeding up a flock to an even uniform type is to keep on classing and culling as far as possible all sheep not conforming to that type. In order to do this, have an ideal in mind and aim to attain it. The first consideration in choosing a sire is to go to a well-known stud and purchase the best ram one can afford. He must possess a good constitution and bold, masculine appearance. Generally the head is a valuable indicator of the type. A ram with a good, bold look conveys the impression that he is fit to be guardian of the flock. He must be covered with wool which is even in quality and showing correct character. Finally, he must be free from hair or kemp, and wrinkles over the body. A good fold on the neck is all that is necessary.

When the time comes to remove inferior animals from the flock, just before shearing is the best time to carry out the work. It is then that the sheep are carrying full evidence of their value as wool producers.

When classing, the fact that the ewes are rearing lambs must be considered; ewes with lambs at foot cannot be expected to be in the pink of condition. They should not, therefore, be culled because of lack of condition alone. If hoggets have encountered severe conditions after being weaned, they may not be well grown, and it may be advisable to hold them over until a later period before passing judgment upon them. When culled for any reason except for age, a distinguishing mark should be put on them so that they can be easily recognised in the yards, and on no account should they be bred from, as their faults are likely to be intensified in their progeny. The wisest plan is to fatten all culls and dispose of them to the butcher at the earliest opportunity.

The Reasons for Classing Wool

[L. K. McKenzie (Brentwood).]

In Australia, sheep and wool compose the leading pastoral industry, hence the most important primary industry is deemed to be wool-growing. Wool is produced by sheep of different breeding, consequently raw wool, even that produced by sheep of the same breeding, will vary in length and strength of staple, fineness of wool fibre, or wool quality, colour and condition. These five properties of the fleece act as principles upon which woolclassing is bassed, and uniform grading of these considerably enhanced the value of wool.

Classing of wool is based on staple length, and is graded according to manufacturers' requirements, as under:—(1) Length up to 1½in. is used in woollen manufacture; (2) Fine Merino from 1½in. to 2½in. long is processed in the continental combing system; (3) Wool over 2½in. is used by English Worsted manufacturers.

Wool with a normal type length in relation to its spinning capacity, is more valuable than that which is shorter or wool with an abnormal length. Therefore, it is of prime importance to grade staple lengths uniformly.

Strength and Quality.

Tender wool is somewhat inferior, and as it yields more noils when combed than spinners wool, it is a depreciated type. It is neither a typical clothing nor combing wool, although it is processed by certain sections of either trade. Sound wool is much more valuable than tender, therefore, it is kept distinct when classing.

Quality is a prominent wool term used in expressing the fineness or coarseness, or spinning capacity of wool fibres. Quality is the aristocrat of principles, considered in the classification of wool clips, and is the firmest basis on which a wool clip can be classified.

Colour and Condition.

The colour of raw wool varies from chalky white to dark-yellow. It is considered to be an important feature to those manufacturers desiring to dye wool a pale shade; these manufacturers require bright wools.

Condition refers to the natural and foreign impurities of the fleece. Since woolbuyers value wool on a clean scoured basis, it necessitates that the condition content of wool be graded uniformly; the pure wool only is priced.

Breeding, together with climatic and pastoral conditions, plays a very important part in the production of the various types and grades of wool. On account of these differences of the fleece, it is but natural that raw wool, even that produced by sheep of the same breeding, will vary in—(*a*) Type conformation; (*b*) manufacturing value; (*c*) monetary worth. Classification of wool is essential in order that wool manufacturers may obtain their respective normal requirements in evenly graded lines.

Wool is highly valued as a textile fibre, and owing to its manufacturing qualities, has been divided into three main groups, viz., worsted, woollen, and hosiery—each section requiring a particular type of wool—

1. Those buyers buying for the worsted trade require sound combing wools. The Bradford System is the most important, and prefers wool of strong quality up to 8in. long.

2. *Woollen Trade.*—Buyers buying for this trade also seek a certain type, and it is short, fine, sound, dense, elastic clothing wool.

3. *Hosiery Trade.*—Requires plain-fibred, spongy wools of about 2½in. long that are lacking in body and compactness, such as English Shortwools, Stumpy Mo., and Short Crossbreds of 56s and finer.

Each buyer has his own particular needs, whether it be spinners, topmakers, free, burry, sound, or tender, and all the various descriptions of wool may be sold at best prices if graded uniformly to length, strength, quality, colour, and condition, as this enables buyers to specialise in the various types and grades needed by their respective manufacturers to obtain their wants in evenly graded lots. Regular lines tend to inspire wool buyers with confidence, which both stimulates and increases competition, and thereby better prices result. So the object of woolclassing is to market greasy wool in accordance with the various needs of manufacturers, also to assist buyers to define the highest possible prices per lb. that they can afford to pay for wool of each grade, thus ensuring full market values to the producers. These objectives are only achievable by the agency of woolclassing.

A Farmer's Clip.

The fleeces of a small clip may be almost as variable in type, conformation, and condition as those of a large clip, so if full values are desired for wool, it should be graded on definite principles, as well as a large clip, but not so extensively.

It is not only improper, but may prove unprofitable to over-class a small clip. Therefore, the number of fleece lines especially, will be reduced to suit the size of the clip being classified. Chief factors for the classer to observe would be:—(*a*) Size of clip; (*b*) type and breeding of wool; (*c*) variability of fleece properties; (*d*) nature and extent of condition. Though no definite advice can be given on the exact lines to be made in a small clip, it is recommended that the commonsense principles of matching wools should be adopted. The object of the classer should be to make the top line as large and as uniform as possible.

It is definitely advisable to back earthy fleeces of farmers' clips, but only as necessary: this operation not only increases the value of fleece wool, but the entire clip sells more readily to better advantage. Backing of fleeces is seldom necessary in clips produced on grass country. Badly classed and unclassed clips cannot be valued owing to uncertainty regarding proportions of the different types and grades baled together. Wool marketed in such a manner does not command the attenion of those buyers best able to pay high prices, but is left to buyers of inferior atypic descriptions in many cases.

The Care and Operation of Farm Machinery

[W. A. HEINRICH (South Kilkerran).]

This subject is one that has been dealt with over and over again, but it is one that will stand it. From time to time new machines are introduced, and the servicing of them may vary somewhat. The fallow plough is expected to work for years without any further attention than that of changing shares. When shares are changed is the correct time to check up the setting of the feet. This can be done by sighting along the bottom of shares with the plough levered right out, or by measuring from the point of share to the front of the body. Share bolts of the correct shape and size should always be used, otherwise trouble will be experienced in keeping them tight. also, the holes will wear out of shape.

On a bridle draught plough, chains and equalisers require periodical attention; the cause of many broken chains and strained bodies can be traced to the bar on which the draught is adjusted. This should be pointing straight down, or a little back at the bottom, otherwise it will have a locking effect. The wheels should be oiled regularly, according to the time it takes for the oil to work through. Oil is superior to grease for the wheels of all implements; grease cuts channels and will not flow to where it is required—it must be forced.

Harrows are another very neglected implement. To do good work it is necessary to have the points fairly sharp and set at correct spaces. The beams should be set to run straight, otherwise the harrow points follow each other and poor cultivation will result.

The combine tines should be checked up at least once a year, and if any are strained, they should be replaced by new ones. Very often they slip in the clamp and then cultivate on the point only, leaving a ridgy seed beed. A piece of very flat ground or a cement floor is ideal for the setting up process. Have the share running quite flat; this gives even wear on the share, whereas if left as most manufacturers send the machine out, the points are deeper than the wing. This may be better in rough ground where it does not give the point so much chance to hook under stumps, &c.

The Drill and Binder.

The stars and interior of the fertilizer feed box should be cleaned and oiled when seeding operations are over; when about to start seeding all that will be required is a little kerosene to loosen all working parts.

The cutting blades of the binder should be sharp and all fingers in good order. The connecting rod should not have very much slack in the bearings; movement in this part causes a short stop of motion in the knife at the end of each stroke, making the knife harder to drive, especially in a heavy crop. To get the maximum life out of canvas, it is necessary to have each pair of rollers correctly lined up, and the job is quite simple. Take a mason's square and hold it along the roller and that should be at right angles with the canvas guide. If it is not correct, the adjustment can be made by slackening or tightening the bar that runs diagonally in that frame. In a binder that has done a considerable amount of work a second grade of twine will usually be found more satisfactory, as it is thicker and fills up the worn parts of the retainer.

The Header or Harvester.

Being high speed machines, these require special attenion to lubrication and adjustment. A spur gear incorrectly adjusted can be completely ruined in an hour; whereas if lined up properly and meshed as deeply as possible without the teeth riding, it will last indefinitely without lubrication. The best lubricating oils available are not too good for machinery, and will prove economical over a period of years. A little colloidal graphite added to the oil will be found quite helpful where bearings are inclined to run hot for no apparent reason.

It is a good plan to effect repairs and replacements before putting an implement back in the shed, and if time will not permit, write up a sheet of what is required and place it in the toolbox for reference.

When putting a header away for the season the comb and knife, as well as the inside of the front elevator, should be given a coat of waste oil to prevent rust. Rust reduces the temper of steel; therefore, such things as the knife require protection from it. In the ball bearings, as well as all other parts fitted with high-pressure lubrication, use a high-grade of transmission oil in preference to grease. Grease contains a percentage of viscotine, which is not a lubricant and tends to clog, whereas oil flows readily.

Even if it is not thought economical to keep implements for long periods, it will pay to keep them in good repair, for they will command a reasonable second-hand value, and that is looked for when trading in for new machines.

Reports Received from Branches

The following is a list of the Branch reports received during the months of January and February, and shows the date and principal subject of each meeting:—Allandale East, 11th February, paper from *Journal.* Appila Yarrowie, 4th February, address, C. A. S. Hawker, M.H.R. Balumbah, 2nd February, harvest reports. Baroota, 14th February, harvest reports. Berri, 21st February, "Wine Marketing," W. S. Garnett. Blackheath, 20th January, paper from *Journal*; 17th February, paper from *Journal.* Blewitt Springs, 11th January, discussion. Brownlow, 9th February, annual meeting. Frayville, 10th February, harvest reports. Glencoe, 1st January, discussion, "Contagious Abortion." Green Patch, 10th February, "Paints and Painting," T. Carey. Hartley, 12th February, "Road

Construction," W. Bermingham. Kelly, 5th February, "Sheep Shearing," F. V. Thomas and A. Williams. Keyneton, 12th January, discussion; 9th February, addresses, J. McKay and R. Jackson. Kilkerran, 7th February, harvest reports. Kingston, December, "Care of Stock," T. J. Goode. Koonunga, 15th December, "Export Apples," J. B. Harris; 12th January, "Finance," Mr. Tavender; 9th February, "Power Farming," M. Wicks. Kybybolite, December, "Wool *versus* Fat Lambs," F. Martin. Light's Pass, 13th December, "Farm Poultry," C. F. Anderson; 14th February, discussion. Lone Pine, December, "The Agricultural Bureau," Ben. Fromm. Maltee, 10th February, paper from *Journal*. McLaren Flate, 20th January, "Book-keeping for Producers," W. M. Ashby. Milang, 18th February, "The Butter Industry," H. J. Apps. Miltalie, 14th February, harvest reports. Monarto South, 19th February, "Care of Chaffcutters," A. E. Hein. Mundalla, 2nd February, discussion. Murraytown, 23rd October, "Hay," W. Joppich; 12th February, harvest reports. Nantawarra, 13th January, paper from *Journal*; 9th February, "Wool Production," A. Bryant. Narridy, 5th Febuary, harvest reports. Penola, 11th February, discussion, "Fire Fighting." Penwortham, 8th December, "*Post mortem* Inspection of Sheep"; 12th January, "Cream Quality," J. O. Hatter; 16th February, "Currant Production," J. B. Harris. Red Hill, 15th February, "History of Farming," T. M. G. Cameron. Rosedale, 15th February, annual meeting. South Kilkerran, 7th February, "Farm Machinery," W. A. Heinrich. Spalding, 21st January, "The 1937-38 Harvest," E. L. Orchard; 10th February, "Wool Production," C. A. Goddard. Upper Wakefield, 28th October, annual meeting; 10th February, harvest reports. Weavers, 7th February, harvest reports. Williamstown, 15th December, "Trip to Queensland," C. G. Fromm. Wilmington, 7th February, harvest reports. Yadnarie, 15th February, annual social. Yandiah, 11th February, harvest reports. Yundi, 12th December, "Marketing of Eggs," M. W. Aird.

Lower North Bureau Conference

With an excellent attendance of delegates from district branches, members of the Lower North Bureaux held a conference at Lyndoch on February 24th. Mr. F. H. Wolf, of the Rosedale branch, presided.

The Department of Agriculture was represented by Messrs. F. Coleman and A. M. Dawkins (members of the Advisory Board of Agriculture), W. J. Spafford (Director of Agriculture), R. C. Scott (Chief Agricultural Adviser), H. B. Barlow (Chief Dairy Instructor), A. G. Strickland, M.Sc. (Chief Horticulturist), A. H. Robin, B.V.Sc. (Government Veterinary Officer), H. C. Pritchard (General Secretary of the Agricultural Bureau), F. C. Richards (Assistant Secretary), and district officers.

Mr. Coleman, in the absence of the Minister, delivered the opening address, and the following papers were read:—"Cement Concrete on the Farm," Col. Dean (Keyneton); "Pig Raising, Mr. J. Mellors (Rosedale). The agenda contained a large number of questions which were answered by departmental officers. It was decided, "That the 1939 conference should be held at Saddleworth"; "That in view of the varying results obtained in weighing wheat samples on miniature scales, a more satisfactory method of deciding market values is desirable"; "That district councils be requested to move cut-off boxthorn on to adjoining properties instead of leaving it on the roadsides." Mr. L. W. George (chairman of the Central Crop Competition Committee) made the following presentations to the successful competitors in this year's competition:—First prize, W. K. Oliver, clock; 2nd prize, W. H. Lawes, clock; 3rd prize, W. L. Hancock and V. Harvey, weather glasses; cleanest crop, M. H. Richter, tramobile;

best crop of barley, R. L. Lines, traymobile. The trophies donated by the Millers' Produce Company were won by Messrs. W. K. Oliver (set of bowls) and W. H. Lawes (entree dishes).

At the conclusion of the afternoon session delegates inspected Messrs. G. Gramp & Sons' "Orlando" winery at Rowland's Flat.

In the evening a social was tendered to Mr. F. E. Waddy, manager of the Turretfield seed wheat farm, on the eve of his retirement from the Department of Agriculture. Eulogistic references were made to Mr. Waddy's valuable services by Hon. A. P. Blesing (Minister of Agriculture), and Messrs. A. M. Dawkins, W. J. Spafford, W. H. Lawes (Lyndoch), P. Maloney (Roseworthy), and F. H. Wolf (Rosedale). Mr. Waddy was presented with an illuminated address from the members of the Lyndoch, Roseworthy, and Rosedale branches.

Agricultural Questions at the Lower North Bureau Conference

[Replies Supplied by the Director of Agriculture (Mr. W. J. SPAFFORD).]

Are the Mercurial Pickles—Agrosan and Ceresan—Suitable for Treating Wheat and Barley Seed?

On the results secured to date in Australia, it appears that the mercurial pickles Agrosan and Ceresan are the best pickles yet discovered for barley and oats, and are as good as any other pickle for wheat. Although more costly than the other ordinary pickles in use in this country, these mercurial substances appear to be more reliable in the control of the smuts of barley and oats, whatever the germinating conditions might be at seeding time, and so they can be used with confidence where trouble has been experienced in controlling these persistent diseases, which are so difficult to eradicate.

Other than the effectiveness shown when these mercurial pickles are used for the control of head-smuts of wheat, barley, and oats, there is no South Australian evidence to support the contention that other diseases of the cereals are also eliminated from crops, and that increased yields follow their use as pickles.

In experimental plots conducted with these mercurial pickles on wheat crops at three different centres in South Australia in 1937-38, the average yield per acre of crops treated with mercurial pickles was 23 bushels 54lbs., and with other pickles 23 bushels 52lbs. per acre. Barley pickled with formalin gave a yield of 35 bushels per acre at Monarto South this year, which was over 3 bushels greater than the yield from the crop treated with mercurial pickle.

How Can a Breeder Ensure the Dropping of Fat Lambs Before June or July?

Sometimes difficulty is experienced in getting crossbred ewes to mate sufficiently early so that lambs will be dropped in April or May, but this is practically never the case with Merino ewes or half-bred Merino X Dorset Horn ewes, and only occasionally with any half-bred Merino ewes, no matter what the other breed in the cross might be.

With nearly all of the pure bred British breeds of sheep, the majority of the ewes refuse to mate until the early autumn, and so but few lambs can be expected until July or later, and with crossbred ewes containing more than half-blood of a British breed, a similar tendency exists, but to a lesser degree.

Merino and half-bred Merino X Dorset Horn ewes can be mated for a certainty sufficiently early in the spring to ensure a full drop of early lambs; other half-bred ewes bred from Merino ewes by British breeds of rams will usually mate sufficiently early for an autumn drop of lambs; crossbred ewes with a predominance of blood of British breeds of sheep are less reliable in this regard; and as the proportion of blood of a British breed increases in the ewes, so the chances of spring mating become less and less.

If it is desired that really high quality lambs be dropped very early in the autumn, half-bred Merino X Dorset Horn ewes should be used as the dams of the lambs, but if this type of ewe is not favoured, the dams should be half-breds from Merino ewes by one of the other British breeds; plenty of rams should be used in the flock, say not less than 1 to 40 ewes, and the flock should be yarded overnight at least once a week throughout the mating season.

Agricultural Inquiries at the Port Victoria Bureau Conference

[Replies given by W. J. SPAFFORD (Director of Agriculture).]

Does the Californian Cape barley impoverish the soil to a greater extent than Pryor barley?

Given similar methods of harvesting and like treatment of the stubbles other than burning, the impoverishment of the soil by Californian Cape and Pryor barleys is almost exactly proportionate to the yields of grain produced. Crops only take from the soil the mineral matters left in the ash after the crop is burnt, plus the nitrogen which disappears during the burning.

Although there is a slight variation in the ash content of different samples of grain of barley according to its quality, and the season in which it is grown, both Californian Cape and Pryor, when the water content is about 13 per cent., contain about 2.5 per cent. of ash, to which must be added about 1.6 per cent, of nitrogen for Californian Cape and about 1.5 per cent. of nitrogen for Pryor. Because the difference in the ash content between the grain of the two types of barley is so slight, the materials removed from the soil when the grain only is carted off the land and the stubbles are not burnt is almost exactly proportionate to the weight of the grain removed. For instance, a 30bush. per acre crop of Pryor barley removes about 60lbs. of mineral matter per acre from the land, and a 45bush. per acre crop of Californian Cape barley will remove about 90lbs. of mineral matter per acre. If the stubble is burnt, the position is different because more nitrogen is dissipated into the air from the burning of the proportionately heavier stubble of the Californian Cape than from the Pryor.

The proportion of straw and chaff to grain varies between very wide limits, but for 6-rowed types of barley it is about 90lbs. of straw and chaff to every 50lbs. of grain; whereas with Pryor barley it is about 60lbs. of straw and chaff to 50lbs. of grain. On these figures a crop of Californian Cape barley going 45bush. per acre would have produced 4,050lbs. of straw and chaff, containing 0.56 per cent. of nitrogen, whilst the crop of Pryor barley yielding 30bush. per acre would have produced about 1,800lbs. of straw and chaff containing the same percentage of nitrogen. This nitrogen would be lost in burning the stubble, and would amount to 22.7lbs. in the case of Californian Cape and 10.1lbs. from the Pryor barley. In a general way, it can be accepted that the degree of impoverishment of the soil by different types of barley is almost exactly proportionate to the yield of grain per acre when stubbles are not burnt, but when the fire stick has been used, Californian Cape barley takes proportionately more mineral matter out of the land than does Pryor barley because of the loss of extra nitrogen, due to the fact that the proportion of straw and chaff to grain is greater with Californian Cape than with Pryor.

Would it be wise or advantageous for growers on Yorke Peninsula to change over from Pryor barley to a 6-rowed variety, such as Atlas?

At the present stage in the development of our overseas market for South Australian barley, it would not be wise to replace too much of the Pryor barley now grown on Yorke Peninsula, because we have not definitely established the placing of large quantities of 6-rowed barley on the British market.

For many years we were led to believe that the United Kingdom wanted 2-rowed barleys grown in sunny climates, and so Pryor was grown extensively for the purpose until a few years ago, when we were informed that the market did not require this type of barley, but had a place for large quantities of 6-rowed kinds grown in sunny climates. This latter contention seems justified judged by the quantity of 6-rowed barley of malting quality sent from the United States of America and North Africa and absorbed by the British markets.

Although we have had some success with 6-rowed barleys for export to the United Kingdom, we have yet to produce large quantities of this type of barley of sufficiently good malting quality to enable us easily to displace the American grain, and until we discover the variety ideally suited to our conditions, it would not be safe to replace much of the Pryor barley of Yorke Peninsula with 6-rowed kinds.

Is a fire necessary in the development of virgin country?

Fire is not absolutely essential in the development of virgin country, but its intelligent use in some conditions hastens the day when the land is brought to its full productive value. With many soils, if left in a state of nature, the accumulation of large quantities of organic matter on the surface of the soil eventually leads to a balance of the life of the soil in which the coarser forms of microscopical life predominate, and then the rougher types of organic matter, such as leaves, twigs, branches, trunks of trees, &c., are never fully decomposed; at all events, not to a form which will dissolve in the rain and be washed to deeper levels or be carried to nearby valleys.

This accumulation of organic matter leads to the development of excessive acidity, or to rawness in which some of the soil constituents are not fully oxidised. Fires, beside destroying the debris on the surface of the land, consume some of the relatively coarse organic matter in the immediate surface layers, lead to the neutralisation of the organic acids, and by killing off the surplus of the coarser forms of microscopical life in the soil, which live on the smaller and more useful forms, help to a greatly increased activity of the useful bacteria which liberate the essential mineral plant foods from the soil particles, and collect nitrogen from the air.

Very little burning is necessary to sweeten and mellow soils in which the surface layers are rich in lime, and for some sandy soils, but heavy-textured soils and those obviously sour are benefited by several good burns in the early days of development.

Is there any manurial value in the ashes left after a stubble burn?

Burning a stubble leads to some of the matter being driven off into the air, leaving a small quantity behind in the form of ashes. Any fertilising material left after the fire must have been present in the stubble before it was burnt, and as the very valuable fertilising substances, organic matter, and nitrogen have been driven into the atmosphere, the ashes left have considerably less fertilising value than did the stubble before it was fired.

There is, of course, some fertilising material left in the ashes after a wheat stubble fire, consisting of about 5lbs. lime, 16lbs. potash, and 3lbs. phosphoric acid per ton of wheat stubble burnt.

After burning of cereal stubble, would it be advisable to cultivate the land immediately after the burn?

If possible to do so, fields in which stubble has been burnt should be harrowed or cultivated in some way whilst still hot from the fire. The stirring of the surface soil is done very readily when the top layer is hot. It prevents the loss of the ashes, and more important still, it aerates the soil immediately after the sterilising effect of the fire, and so activates the useful soil bacteria left after the larger and less useful have been killed off by the heat.

What amount of heat per square foot is required to give full benefit when using fire to help prepare virgin land?

In crop growing the heating of soil is becoming increasingly popular, and is practised largely in glasshouse culture in most up-to-date countries of the world, but little, if any, work has been done in open fields towards showing what temperatures are necessary to lead to the beneficial results which usually follow the burning of stubble or rubbish.

In glasshouse culture, however, it has been found that the raising of the temperature of the soil to 212° F. to a depth of 1ft. leads to the killing of most fungus diseases and insect pests which infect the crops from the soil, and at the same time leads to the increased fertility which always follows intelligent soil sterilisation.

[Replies given by R. C. Scott (Chief Agricultural Adviser).]

To what extent has the inoculation of seeds been practised? Is it advantageous to cereals?

The inoculation of cereal seed has no value. In South Australia seed inoculation has only been practised to a limited extent. The relationship with plants and soil bacteria only occurs with the legumes such as clover, beans, pease, lucerne, &c. The cereals belong to a different botanical order. They are grasses, and do not live in direct association with soil bacteria. Consequently there is no advantage in inoculating cereal seed with any soil organism before planting. The importance of the nodules containing bacteria on the roots of leguminous plants was discovered by a German chemist, Hellriegall, exactly 50 years ago, and since that time artificial inoculation has been practised.

The cultures containing the bacteria have been prepared in various forms, some in liquids, jellies, or powders. The use of these cultures has not become general, since the majority of the soils cultivated for any length of time already contain the required organisms. However, in some virgin land cleared from the natural vegetation, this is not the case, and favourable returns have been obtained from inoculated seed. This occurred at Kangaroo Island with lucerne and pease, and with the first-named fodder at Tintinara. On the other hand, Subterranean clover seed did not respond, and little benefit from inoculation resulted. The Subterranean clover seed is naturally produced underground, and the soil bacteria still adhere to it despite harvesting operations, whilst in addition, grains of soil containing bacteria are usually included in even the best-cleaned samples.

What amount of chaff, grain, or ensilage should be fed to ewes before and after lambing?

Although in-lamb ewes have to produce wool and also develop the foetus, the requirement for additional nutrients is not great until the time arrives to actively stimulate the milk flow.

The total amount of dry matter that a 100-lb. sheep will consume is about 2½lbs. per day, and although a concentrated food may be fed, she should always be able to obtain sufficient roughage to fill her stomach. With good quality chaff, approximately 1¾lbs. per day is sufficient to maintain a ewe in strong healthy condition, but about a fortnight before the lamb is due, the ration should be increased to a total of about 2lbs. per day. This quantity would be continued after the lamb is born.

There is little to choose between the feeding value of the different cereal grains. Barley and wheat are generally speaking about equal, with oats a little better for the production of milk. On a food value basis with wheat at 4s. per bushel, Pryor barley is worth 3s. 2d. and oats 2s. 2d. The present prices are 4s., 2s. 9d., and 2s. 6d. respectively, and therefore barley is the most economical grain for sheep today. A fair grain ration with roughage is 1lb. per head per day, but in late pregnancy this should reach 1½lbs. per head per day. A maintenance ensilage ration is about 4lbs. per head per day, increasing to 5lbs. later on or supplementing the original ration with ¼lb. oats or bran.

Activities of Women's Branches

Women's Branches at the Lower North Conference

Sponsored by the Sheoak Log Branch, a conference of Women's Branches situated in the Lower North was held at Lyndoch on 24th February. Mrs. S. L. Bowden presided. During the afternoon delegates in company with representatives from the Men's Branches, visited Messrs. G. Gramp and Sons' "Orlando" wine cellars at Rowland's Flat, and Miss E. Campbell, of the Education Department, spoke on "Laundry Work" and "Furniture Renovation."

The following papers were read:—

The House of Dreams.

[Miss S. A. Dahlenburg (Sheoak Log).]

The provision of a home is always a serious problem confronting the newly-married couple—where to live; whether to rent or build a house, or take a flat. There is a very strong tradition which favours starting off in a home of one's own, providing the financial facilities for so doing are available. What sort of home do you imagine a married couple should have? A happy couple on whom fortune has smiled and bestowed good looks, popularity, and sufficient wealth to enable them to build a luxurious home—your imagination would probably run riot at the thought of such married bliss and so many material advantages. It would be a dream home, indeed, if you had your own way!

Planning the layout is the all-important question, as well as visualising it set in a beautifully planned, but "close-to-Nature" garden. So many builders of homes decree that splendid trees, that have perhaps seen a century of summers pass by, must go before the axe. The garden is so planned that every window of the house overlooks serene green, intermingled with floral gaiety. Framing all—trees. Trees for utilitarian purposes; trees for shade and seclusion, for background, and trees just for themselves and that deep sense of peace, security, and rest which they lend to house and home.

Remember that when the front door swings open, an impression of the home goes out. Is it dull, lifeless, or does it radiate brightness and cheerful hospitality? Life, it is said, is very largely what our mental outlook makes it, and so it would be lunacy to surround ourselves with drabness that reacts unconsciously on our welfare. Everyone works better in cheerful, colourful surroundings than in depressing ones. Everyone feels better; and every day in every way women of the home are grasping the truth that bright colours are just as cheap and economical as the mournful kind. Specially decorated and furnished, the rooms for rest, play, and work in the House of Dreams have a mentally beneficial effect on the occupants. They should be entirely different in line, colour scheme and design, and those who recognise and cater for this need will be far happier and more efficient. The work room need not be large, but to be successful it must give the effect of space. You may have one room to play in, or you may have six, but the interpretation is the same. They are the rooms in which you eat, talk, entertain, and generally enjoy life. The colour scheme must be gay without being irritating in any way.

Yet there are many pitfalls for the unwary in modernising an old home, and it is not the job to be undertaken in preference to the planning and building of an entirely new one. Many of you can remember the days when every living room hid its paint or wall paper beneath a varied collection of plaques and family portraits. Shorn of clutter and skilfully transformed by colour, a room can be made to radiate an atmosphere of charm, light, and order. Simplicity plus colour certainly equal beauty, and these two factors are the only basic principles in creating a distinctive atmosphere in the home.

INTERIOR DECORATION.

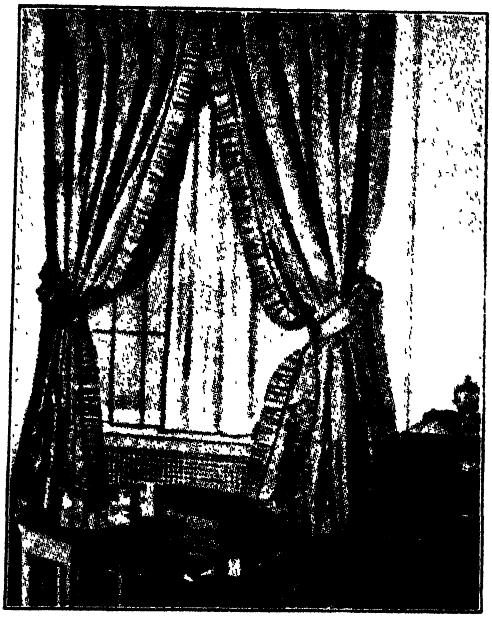
Interior decoration is not exclusive to mansions and sumptuous apartments, nor is it entirely the prerogative of experts, valuable as is their influence. In these days when glowing colour and simplicity are the primary requirements of home decorating, it is possible for every woman to be her own decorator. Every home, however humble, can be glowing and inviting with colour. Every home can be a true expression of personality, and a background for pleasant living. Clever use of soft or vivid tones is the secret of charm in interior decoration. Walls, floors, and ceilings are the starting places for all decorating. They represent the largest decorative area in a room, and must be settled first. One of the most valuable modern contributions to home decoration has been to abolish the vogue for dingy-hued walls or violently-coloured wall paper, and to reveal the beauty of light-toned walls, making a restful background for the furniture in the room.

Why are some rooms more pleasing than others for no apparent reason? Why does this room seem restful and friendly, another full of life and interest, and others depressing or irritating? Nearly always the answer is the way colour has been used. But perhaps the room is quite correct as far as colour combinations are concerned, yet its very formality almost freezes one. Why? Simply because the rooms are bereft of grace and friendliness, and so lack that "lived-in" air. Gracious touches give rooms their appealing charm. It is the flowers and pictures, the china and glass, lovely draperies, and all those little treasures one collects, that make a home seem friendly and inviting. That is, of course, if we make the most of them. Grace in arrangement or grouping is all that is required; beauty follows as if by magic. The problem of arranging furniture is not difficult when one understands the basic principles of good arrangement. This is simply fitting furniture into a room so that each piece will provide its full measure of service, not concentrating too much on balance—that is, placing pieces at exact intervals around the walls, giving a stiff appearance to the room.

The spacious windows, capturing the maximum of light and sunshine, the furniture embracing only utilitarian pieces inviting constant use, make the modernly-planned dining room a bright and friendly room—just what it should be. Cheerful surroundings, charming table arrangements, and good food make for better health and happiness.

BEDROOM AND KITCHEN.

The bedroom is designed to provide the utmost comfort, yet suit the personality of the occupier. The room in which you sleep is, more than any other, the one room in the house in which your own particular ideas for a decorative scheme that is charming and individual should have full rein. But no matter how original, how bizarre, how conventional or how subdued ideas of decoration for bedrooms may be, never lose sight of the main essentials—comfort and an atmosphere conducive to perfect slumber. For, after all, the bedroom is designed for sleeping in, and usually for dressing also. Infinitely more thought and care are given to-day in the selection of furniture and fabrics for bedrooms, and more individuality is expressed.



In the ideal home to-day, the kitchen, a model of up-to-date efficiency, has become the focal point of interest, and the scene of new improvements of every kind. The demand for labour saving and cleanliness in the modern kitchen has made it almost as impersonal as a hospital ward, but, to give it its due, it must be given back its personality as the heart of the house. Just imagine—a room especially planned to simplify cooking in every way that is possible. This is the modern kitchen which, with every convenience and appliance, makes cooking a pleasant pastime. Some years ago bathrooms decided to blossom with colour, and the old style of decorating and fitting with matching equipment in dead white gave way to warmer tones. The bathroom, as with the other rooms, is smartly modern in design and equipment.

Look on the sunny side of life from a gay sun room, or turn that little-used verandah or balcony into a happy spot where summer-time meals can be enjoyed. To-day's sun porch is the one place where you can forget all the rules and let yourself go on furnishing. If the verandah or balcony has been taken more or less for granted, plan to make it a place where even grey days will be gay days. With a background of colourful cane or lacquered wood furniture, and a host of gay cushions, this should be easily achieved.

Despite the fact that we all at some time or other dream of owning a home of our own, the modern flat continues to offer the most practical solution for living to a very large number of people who, for economic or other reasons, find the small home unit best suits their requirements.

The modern trailer combines transport with all the convenience, comfort, and charm of a modern home, so it is no wonder that holidaying and even living in the modern caravan has become a world-wide craze. You hitch a trailer to your car and off you go and live the adventurous life of a nomad, and still have the comforts of civilisation.

Furnishing the home is an exciting adventure. The ultimate possibilities are so innumerable—the variety of colour schemes endless, the styles ornate, simple, old world, ultra modern, or just plain homely, offering a bewildering choice. There is magic in colour; it waves a wand and transforms shabby, old-fashioned rooms into gay modern places. To say that colour is magical may sound extravagant, but often, with the aid of colour alone, you can entirely rejuvenate dull, depressing rooms, and turn them into modern places full of life and glowing tone and shade, it must be admitted that colour possesses the power of a wizard. Finally, remember that success in home decorating is not what you think other people will like, but what you will like yourself.

Sport and Recreation.

[Miss P. Tremlett, Sheoak Log.]

Sport in these days is taken up at a very early age, which is the best time to begin. In one's life a certain amount of sport is necessary and desirable, but do not let it become detrimental to your work. Sport is a fine thing for young folk, in moderation, and it helps to instil in them many valuable lessons which go to make character. Taking a defeat good naturedly in any game will help one to make the best of the setbacks which are sure to come in life.

For an outdoor sport in summer, tennis is undoubtedly the most healthy and popular game, in which both young and old may join; but for those who find it too strenuous, I suggest croquet. Another summer sport for all ages is swimming, and for those who are fortunate enough to live near the swimming pools or beaches, what could be more enjoyable than a swim.

With winter approaching, our thoughts turn to golf, hockey, or basketball, and many a winter evening may be spent at cards, table tennis, reading, and music. Then sometimes of an evening, when one is not really too tired, but feeling a bit "blue," a dance is a very good remedy; a little bright music and meeting a few friends will brighten dull spirits.

So we should all try to lead a well-balanced life. Too much work makes us dull and mechanical, and too much play finally makes us weary of ourselves; but given a right blending of duty and relaxation, one should attain a broad-minded and happy viewpoint of life. Joining in sport gives one the opportunity of making a larger circle of friends.

Washing Day.

[Miss K. Bammann, Sheoak Log.]

It is generally found that the women of Australia wash according to their means. In many of the humble homes of our cities and the outback women will be found washing with a kerosene bucket on the stove in a tin kitchen. Many use the various advertised forms of soap. Then there are washing machines and electric machines, a boon to every housewife who is fortunate enough to possess one. It is important to remember that the care and use of laundry utensils must be considered. Galvanized iron tubs should be scoured with bathbrick and hot soapy water. To prevent leakage, a little water should be left in wooden tubs. Concrete tubs are most satisfactory, but the fixed tubs with inlet and outlet for water are decidedly the best.

Pressure should be released from the wringer after use, and the rubber rollers cleaned with turpentine. The clothes basket should be washed with warm soapy water and rinsed with cold salted water to harden the wood. Some clothes lines are detachable, and can be left in a bag after use; otherwise wash them occasionally. The copper should be scoured with sanoper or salt and vinegar.

There are many kinds of irons, including flat irons, box, electric, gas, and polishing irons. Flat irons are made of cast iron faced with tempered steel, and before using they should be rubbed on a beeswax bag, then on powdered bathbrick, and then wiped with a duster. To store flat irons, rub with mutton fat or vaseline.

In preparing for washing, first select the day, preferably at the beginning of the week, so that the clothes may be put away; it is more conducive to good health to get rid of soiled clothes, a weekly wash is always best. Time can be saved if on the previous day the clothes are collected, the copper filled, and the fire set. Sort clothes into separate heaps, such as bed, body and table linens, woollens, silks, coloureds, and towels. Overlook them for tears and stains, which should be rinsed and mended roughly.

Soaking should be done in tepid water, rubbing the soiled parts with soap, the dirtier clothes being placed at the bottom. The cleanest clothes should be boiled first, and placed in copper when water is only warm, with some shredded soap. If possible, boil for 20 minutes, then rinse in cold, clean water and blue. Blue is used to counteract the yellow appearance in clothes caused through wearing and the use of soap. Extra blue should not be added while the clothes are in. For wringing, the clothes should be folded evenly, with the buttons inside to prevent breaking.

Starching stiffens and improves the appearance of material, and thus enables it to keep clean longer. Borax will give a gloss to linens. Clothes should be hung in a breeze where the sun will help to disinfect and whiten them. All garments should be hung the wrong side out and with the openings towards the wind. They should be hung by the thickest part. Handkerchiefs should be pegged three or four together. Starched articles should be taken down before they are quite dry. Stockings should be hung in the shade and by the toes.

WASHING COLOURED CLOTHES, SILKS, &c.

If colour is loose, soak in cold water and salt (1 tspn to 1 pint) for 10 minutes. Wash in tepid, soapy water and rinse. Rinse a second time, adding salt to fix the colour, and a little vinegar to brighten. Hot water and soda must be avoided. Wash and dry quickly. Prints may be stiffened with gum water or starch, and should be hung to dry in a shady place. Ingredients for gum water: ¼lb. gum arabic, 1 quart boiling water. Method: Wash the gum in cold water to remove dust and fibres. Add boiling water and leave in a warm place, stirring frequently until gum melts. Strain through muslin and bottle. Blue prints and those with a white ground may be glued. Print shirts of really fast colours may be boiled occasionally.

Silk should be washed by squeezing into two tepid soapy waters. Rinse in tepid water and then in cold water. To stiffen, add gum water (1 tspn to 1 pint), squeeze lightly and shake out. Roll in clean towel until nearly dry, then iron with moderately hot iron on right side. Air and fold. For coloured silks add salt to fix colour and vinegar to last rinse water to brighten. When washing tussore, fuji, or Shantung, avoid gum water and blue. Black silk should be rinsed in deep blue water and ironed on the wrong side. For men's ties tack the lining into place and wash as silk; remove tacking thread just before ironing.

Muslins are delicate fabrics, and therefore need more careful treatment than ordinary white clothes. Soak in cold water and wash in warm water to which dissolved soap has been added. Squeeze only and do not rub or pull, as it may displace the threads. Rinse, boil, and rinse again in cold water. Blue and starch or use gum water. Roll in cloth and leave for some time, then iron while still wet on right side to give a gloss. Lace should be washed in warm soapy water, but do not rub it. If very soiled, boil carefully, rinse in warm water to remove soap, and steep in cold water to clear it. If white, it may be blued and stiffened with borax (1 tspn to 1 pint), gum water or 1 loaf sugar to 1 cup water. Stretch and roll in clean cloth. Do not blue cream lace, but add saffron, coffee, tea, or cream starch. Iron on wrong side over flannel pad, pressing points out carefully. Real lace may be pinned into position on a clean cloth and left to dry instead of being ironed. Georgette, chiffon, and linen should be washed like lace (carefully), stiffened with gum water, and ironed the selvedge way.

Before washing wool, shake to remove dust and dirt. Wash by squeezing in two soapy waters, rinse in tepid or cold water to remove soap, adding cloudy ammonia to last rinse. Blue may be added. Shake to raise the woollen fibres. Dry outside if possible in a shady place, and mangle or iron with a moderate iron. For coloured woollens add vinegar to the last water to revive the colour. When washing woollens do not use soda, hard soap, or hot water, and neither rub nor wring.

For miners', engineers', or painters' clothes, use kerosene water. Put 4galls. water into copper and add ½lb. shredded soap and 1oz. washing soda. When boiling, add 1 or 2 tbspns. kerosene and mix well Shake clothes and place in boiler dry, and boil for ½hr., removing scum as it rises. Rinse in tepid water with a little washing soda to remove kerosene. Dry outside.

REMOVING STAINS.

It is perhaps best to try the simplest methods first. When applying chemicals, use a bone spoon and remove as soon as possible. Wash thoroughly after using chemicals. Oxalic acid is a poison and should be kept from the reach of children. To apply: Stretch the stain over a bowl and pour boiling water through. Apply the acid with a bone spoon and again pour boiling water through. Boil as usual.

Tea, Coffee and Cocoa Stains.—While wet pour boiling water through. Soak in a solution of borax or use oxalic acid.

Fruit and wine stains can be sprinkled with salt and boiling water poured through while still wet. Use salt and lemon or oxalic acid.

Red ink can be soaked in water and vinegar.

For iron mould use oxalic acid.

If a paint stain is still damp, wash in hot soapy water, and if dry use turpentine. Then rub with benzine.

For tar, scrape off surface and cover with fat and kerosene, and gently rub between hands. Wash in benzine.

Grass stains can be removed with methylated spirits.

For grease use hot water and soap or benzine. For candle grease use a hot iron over blotting paper.

Moisten wildew with soap and sprinkle with French chalk. Bleach in the sun. Repeat this process if necessary. Chloride of lime can also be used.

For perspiration soak in a soapy solution and leave in the sun.

A Few Business Suggestions.

[Mrs. S. L. Bowden, Sheoak Log.]

To many women folk business is indeed a very dry subject, but it is something that is equally important to women as to men, and a little knowledge in this direction is an asset to one through life in many respects. Apart from a position in an office, there are many other paths in which it may be utilised. If one chooses to run a shop, for example, or perhaps a guest home or private hospital, in the case of a nurse a knowledge of book-keeping is almost essential, and thus proves a great asset. Education is not a burden to carry, and whatever the nature of it may be, it all helps to broaden one's mind and gives one more confidence in making oneself a useful citizen. Also, it often helps considerably in ordinary life, especially to your partner if married.

When one thinks of business subjects, book-keeping and business correspondence are perhaps foremost, with the exception, of course, of typewriting and shorthand for office work. The latter two subjects are not necessary in the ordinary management of affairs. The idea of book-keeping is to have a correct, complete detailed record of all transactions over any length of time. A number of people trust to memory, but it is impossible to remember accurately after years have intervened.

An elaborate form of book-keping is not suggested. I propose to deal with a simple method, which is accurate and in which a record of all business dealings may be kept perfectly. Three books are all that is necessary, and at the same time a double entry system is carried out.

Firstly one needs a day book, in which all transactions must be entered; then a cash book, in which all receipts and payments must be entered; then comes the indispensable ledger. All these books are sold at booksellers, and can be obtained with cheap bindings, etc., for only a small sum.

A day book is ruled thus, and to be used as follows, showing an example of a sale:—

1938. Date.	Complete Entry.	Folio.	£ s. d.
Feb. 10......	Mr. A. Jones—To 1 cow		6 0 0

In the case of a purchase, the entry should be as follows:—

A 1938.			
Feb. 10......	Mr. A. Jones—By 1 cow		6 0 0

If Mr. Jones was an employee and he was receiving wages the entry would be: Mr. Jones, by wages.

If receiving commission from Mr. Jones, the entry would be: Mr. Jones, to commission; and so on, whatever the case may be.

The cash book is a very simple book to manage, it being ruled practically the same as a day book, but with usually two £ s. d. columns. Here one uses the two sides of the book, the two pages being numbered the same. The left-hand page is known as the cash receipts or debit (Dr.), the right-hand page the payments or expenditure or credit (Cr.) side. The idea of the two £ s. d. columns is to enable one to keep a record of the petty cash as well as the banking money.

Now, when Mr. Jones pays for the cow the money is entered on the left-hand or Dr. side. Example:

Dr. *Cash Receipts.*

1938.		
Feb. 10 ...	To A. Jones	6 0 0

If selling a cow to Mr. Jones, it is entered up and carried forward to the next page, the amounts as follows:—

£ s. d.	1938.	*Expenditure.*	Cr. £ s. d.
	Feb. 10 ...	By A. Jones	6 0 0

When one page is full of entries, the two sides or pages are added up and carried forward to the next page, the amounts as follows:—

(On the first page)	(On second page)
To brought forward .... £ s. d.	By brought forward .... £ s. d.

The ledger is the all-important book. To all clients, together with the particular business dealings, a separate page in the ledger is allotted, each page being indexed for quick reference. When time is available enter the transactions of the purchase and sales book, together with the cash book items, into the ledger. In the case of selling the cow to Mr. Jones, look up Mr. Jones' page and enter the transaction on the Dr. or left-hand side, not forgetting to enter the folio number of the purchase and sales book into the ledger folio column and the ledger folio number into the purchase and sales book column. The entry of the cash received from Mr. Jones from the cash book is entered on the right hand or Cr. side by using the word "cash," again putting the folio of the cash book into the ledger and *vice versa*. An example of Mr. Jones' page in the ledger would show as follows:—

Page 1.

Dr. Mr. Jones, Clare. Cr.

1938.			£ s. d.	1938.			£ s. d.
Feb. 10....	To 1 cow......	Folio.	6 0 0	Feb. 10 ..	By Cash	Folio.	6 0 0

Then you turn to your Cattle A/c. in your ledger and enter, for example:—

Dr. Cattle Account. **Cr.**

				1938.			£ s. d.
				Feb. 10 ..	By A. Jones ..	Folio.	6 0 0

Not forgetting the folio numbers.

If, for example, he only paid £4, the cash entry would be £4, and this would clearly show in the ledger a balance of £2. Of course, in the case of a number of entries, each side is added, then balanced. In the case of buying the cow, the ledger would show:—

Dr. Mr. A. Jones, Clare. **Cr.**

1938.			£ s. d.				£ s. d.
Feb. 10....	To cash	Folio.	6 0 0	Feb. 10 ..	By 1 cow	Folio.	6 0 0

Dr. Cattle Account. **Dr.**

1938.			£ s. d.
Feb. 10	T. A. Jones ...	Folio.	6 0 0

If the cow was sold through an auctioneer, say, at the Abattoirs, and commission had to be paid and perhaps railage deducted, the account would stand thus in the day book, for example:—

S.A. Farmers' Union.

To 1 cow	£6 0 0
By commission	0 5 0
By freight	0 5 0

Thus you would receive £5 10s., to be entered in the cash book. The ledger would show:—

Dr. S.A. Farmers' Union, Adelaide. **Cr.**

1938.			£ s. d.				£ s. d.
Feb. 10....	To 1 cow......	Folio.	6 0 0	Feb. 10 ..	By commission	Folio.	0 5 0
					By freight.....		0 5 0
					By cash.......		£5 10 0
			£6 0 0				£6 0 0

Not forgetting, of course, to enter freight and commission in their respective pages, using folio numbers. All dealings with the same person, animals, articles, etc., are entered on their particular page, thus when balancing the books monthly or yearly a complete record of all dealings are grouped together under their respective headings. For example, if desirous of knowing how many lbs. of butter have been sold during the year turn to the butter account in the ledger, providing, of course, the books are written up to date. In closing or balancing accounts, all personal accounts are closed "by balance" or "to balance." All object accounts are "by (or to) profit and loss."

An example showing how to balance an account:—

Dr. S.A. Farmers' Union, Adelaide. **Cr.**

1938.			£ s. d.	1938.			£ s. d.
Feb. 10....	To 1 cow......	Folio.	6 0 0	Feb. 10 ..	By commission	Folio.	0 5 0
Feb. 10....	To commission on sheep		5 0 0	Feb. 10 ..	By freight.....	Folio.	0 5 0
Feb. 10....	To cash		50 0 0	Feb. 10 ..	By lambs, 100	Folio.	56 0 0
Feb. 10....	To balance ...	c/d ..	1 0 0	Feb. 10 ..	By cash.......		5 10 0
			£62 0 0				£62 0 0
				Feb. 10 ..	By balance ...	b/d...	1 0 0

Thus showing a deficiency of £1 underpaid. If books are kept it is quite easy to make up a balance sheet, showing assets and liabilities in a very short time; also the preparing of income tax returns becomes a simple matter.

BUSINESS CORRESPONDENCE.

Firstly, a business letter should always be written in ink, and only on one side of the paper. Always remember to write plainly, though this is something a lot of business people have yet to learn. Never treat a business letter with familiarity. After the usual beginning, if a business letter is in reply to one received, it should start off to that effect, such as, "Yours to hand of even date and contents noted"; or, "I am in receipt of your letter of even date"—that is, of course, if you reply on the same day you received the letter. If it is in the same month, use the word "inst," being abbreviated for instant; example, "Your letter of the 26th inst." If the letter was received in the previous month use "ult." If writing in reference to something in the following month, then use prox." If writing about some particular thing, mention that at the beginning, such as "*Re* cornsacks," etc.

The first paragraph must contain the matter which is being written about, and there are more or less set beginnings to letters. For example, if you wish to tell something, a usual beginning is, "I beg to inform you . . ."; or, perhaps, if you want goods sent begin, "Will you be good enough to forward to me . . ." The body of a letter should be compact, concise, short, and to the point. Do not use unnecessary phrases; do not curtail the letter so that the meaning is not understood, but do not go a long way to say very little. A business letter should always be polite.

If asking favours in any way at all, the usual ending is, "Thanking you in anticipation. I am."

Never sign "I am" if ending your letter with a sentence. The above is only a phrase, and as it is necessary for it to be a sentence, that is the reason why the words "I am" (or "we are" for plural) are written underneath. Then use a business ending, such as "Yours faithfully." Never use "Yours sincerely," for example.

Never sign "Mrs."; but if the person to whom you are writing does not know whether you are Miss or Mrs., then it is essential for you to place the word in front of the name in brackets (Mrs.).

Pages should always be numbered, and on the top line of all the following pages write the name of the person to whom you are writing.

There are many women who do not know how to indorse a cheque. If your name, for example, is Mary Ann Jones and your husband's is John Jones, and the cheque is one that needs endorsing and is made payable to Mary A. Jones, all that you have to write on the back is "Mary A. Jones"; but if the word "Mrs." prefaces it, you must then write "Mary A. Jones, wife of John Jones," and the same applies if the cheque is payable to Mrs. John Jones. Example: "Mary A. Jones (usual signature in this case), wife of John Jones."

Gardening Tips.

[Miss K. M. Koch, Sheoak Log.]

All manner of cut flowers—even the short-lived varieties—will last twice as well if a small piece of charcoal is put in the vase or bowl in which they are arranged. The charcoal also keeps the water sweet and fresh. In areas where water is not laid on, remember that a thorough soaking twice a week is better than a sprinkling every day.

Do not throw away shrivelled-looking sweet pea seed. Seeds of some varieties (especially the darker shades) are small and shrivelled. It is a mistake, too, to discard frail seedlings. Some shades are weaker in the early stages, but develop later. Nip the early buds off zinnias, phlox, petunias, and antirrhinums; no plant should be allowed to flower until it has obtained a good root system and is a strong, sturdy plant.

A garden adorned with trees and shrubs is usually admired. They are useful to fill in awkward corners and provide brightness where flowers will not bloom. To keep lawns green in summer, water as often as possible or have sprinklers going for several hours a day.

Dig deep and drain well for successful cultivation of hardy annuals. Cover unsightly places in the garden with climbers. To keep hydrangeas indoors, cut at night or in the early morning, scrape the bark from the stems, split the ends and allow to stand for a few minutes in boiling water. Carnations are lime lovers, so sprinkle a little lime around from time to time, and fork in lightly; also dust the foliage to keep free from pests. Mealy bug on coleus plants can be cleaned off with a camel hair brush dipped in methylated spirits. If geraniums are pruned every year into shapely shrubs they will produce finer blooms. Violets grow well in lime-treated soil, and a dressing of bone manure is also very beneficial.

FERNS AND PERENNIALS.

When asparagus ferns look straggly, cut them right down to the ground. New shoots will soon appear. Do not allow perennials to flower during the first season. This will allow the plants to become firmly established and will result in better blooms the next year. Flowers and ferns in pots are greatly benefited by watering with weak tea. About a month before putting in plants, the ground should be dug up roughly and well limed. For lucerne flea sprinkle affected plants with tobacco dust. Linaria planted among hardy perennials will soon cover bare patches. Do not sow seeds too thickly, or weak, spindly plants will result.

Spring is the best time for potting most plants, as the majority then show signs of new growth. Place large pots on bricks or blocks to provide for free drainage. Gladiolus corms may be replanted 6 weeks after lifting. Weak liquid manure may be used as a stimulant once a week. Cannas are easily grown and make a nice show in summer. Plenty of water is essential. An occasional pergola or rose arch lends a wonderful charm to the garden and presents a glorious spectacle when covered in bloom. Mulching is a great moisture preserver. When using sulphate of ammonia be careful not to let it touch the foliage, as it will burn the leaves of any plant. There is always unlimited scope for improvements, and when a chance occurs for substituting a better plant adopt it. Arrange flower borders in gradual artistic steps, taking care that the colours blend harmoniously. Endeavour to provide a continuity of flowers the whole year through.

Nursing.

[Mrs. B. HORSNELL, Sheoak Log.]

Girls who have passed the Q.C. or any higher examination need not pass any special test before beginning a nursing training, but those who have not done so must pass an educational test set by the Nurses' Board of South Australia. Trainees are accepted at the Adelaide Hospital or Children's Hospital, at most Adelaide private hospitals, and at almost any country hospital. Some of these hospitals, however, are only part-time training schools, and nurses beginning their training at a part-time school must complete it at a full-time training school.

The period of complete training at the Adelaide, Children's, Port Pirie, and Mount Gambier Hospitals—the four Class A training schools—occupies a period of 3 years; while that of the B Class—Renmark and Port Augusta Public Hospitals and at 5 private hospitals ("Calvary," "Rua Rua," "Memorial," Hutt Street, and Wakefield Street)—is completed in 4 years. All other hospitals, which are also training schools, provide only part-time training, and among these are included two private hospitals—Rose Park and "Parkwynd." After 2 years in one of these part-time schools, a further period of 2 pears is required in a Class A training school (or 2½ years in a Class B) to complete training. It is now possible for a nurse who has completed training at the Adelaide to do an extra 5 months' course at the Children's, in order that she may gain practical experience in the nursing of children and their complaints, and to gain an extra certificate. Likewise, a Children's Hospital trainee may do 3 months at the Adelaide and so gain experience in adult nursing. An extra training period of 9 months at the Queen's Home is necessary to obtain a midwifery certificate.

Unlike most training courses, the nursing course is one in which the trainee pays no fees, but on the contrary receives a small salary during her years of training. At the Adelaide Hospital this increases from 11s. 6d. to 15s. 4d. in the final year of training. Trainees entering this hospital must do so for a probationary period of 3 months. After this time, if they prove satisfactory, they are accepted as trainees and have to sign a contract bond and pay a fee of £5, which is refunded at the end of training, or placed in the library fund if the contract is broken. Each trainee sits for 3 examinations, apart from the final, during the course of training. The first subject is physiology, then surgical and medical nursing. Lecturers are appointed, and each girl must attend a course of lectures; trainees must also obtain an invalid cookery certificate.

Of recent years the demand for nurses in South Australia has often been greater than the supply, and it is contended that the reason for this is that the rates of pay for trained nurses are higher in other States. Since last November, however, it was decided to increase fees from £3 3s. to £4 4s.; an extra guinea may be claimed for nursing a mental or an infectious case. All trained nurses may not wish to do private nursing, and positions are available from time to time in hospitals, in the Public Health Department, Education Department, and as district nurses.

To become a good nurse a girl must possess considerable intelligence, healthy physique, be well mannered, have an even and sympathetic temperament and deft and clever fingers. The uniforms should be worn correctly, and the whole appearance must give the impression of extreme cleanliness and neatness. It is a matter of experience how quick patients are—no matter to what class they may belong—to appreciate the aforementioned qualities, and even more ready are they to notice any lapses, such as a dirty uniform, untidy colour, or dirty nails. The wearing of jewelry and the use of perfume and glaring facial "make-up" are forbidden.

The secret of success in dealing with all patients mainly depends upon the use of tactful discipline, and it has well and truly been said that a well-trained charge nurse can keep order in a men's ward better than a military ward-master, and such a nurse will be far more respected and appreciated than one who neglects the discipline. A nurse should not openly favour patients, but should endeavour to minister to all alike, according to their requirements, whether they be grateful or otherwise. Another virtue for the nurse to cultivate is that of quietness, and it is surprising what mental effect a noisy nurse with creaking shoes, heavy tread, and rustling uniform will have upon a sick patient. There is one other point a nurse must not forget, and that is to use her eyes and be able to report to the doctor any questions regarding the patient's condition. She should be obedient to those above her, and never discuss hospital patients and their ailments with any other than the hospital nursing staff.

Cooking Hints.

[Replies supplied by Miss E. Campbell, of the Education Department, to questions submitted at the Lyndoch Conference.]

Why does a fruit cake, in cooking, open on the top?

Before putting a fruit cake into the oven it is necessary to have an evenly heated oven and of sufficient heat to immediately cause the gas to start expanding and the ingredients to rise evenly. Should the oven be even slightly too hot, the starch in the surface layer will be cooked and a firm crust formed on the top of the cake; then when the heat has penetrated to the centre of the mixture, the enclosed gas expands, thus causing the ingredients to rise. The force of this mixture rising fractures the firm crust, thus giving a broken appearance. A well-cooked cake should be level on top, not broken, and the whole cake of an even colour.

What will prevent a sponge sandwich from sticking to the plate after it is cooked?

This may be caused by three things—(*a*) Either the cake has not been properly cooled on a wire cake stand or folded tea towel after it has been removed from the cake tins. In this case, when the cake comes in contact with the cold china, the steam condenses and this moisture causes the surface of the sponge to become soft and sticky, thus adhering to the plate. (*b*) The cake was not thoroughly cooked, and then the surface coming in contact with the cold plate causes the sponge to stick. (*c*) Perhaps the plate had just been washed and it was not perfectly dry.

To prevent a sponge from sticking to a plate, it is necessary to have the surface of the cake thoroughly cooked and cold and the plate dry

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A. P. BLESING, *Minister of Agriculture*

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Agricultural Bureau Conferences, 1938

River Murray, at Berri, 16th June (Mr. E. J. R. Johnson).

Eyre's Peninsula (West), at Ceduna, Wednesday, 6th July (Mr. P. S. Morrison, Laura Bay).

Upper North, at Appila, Wednesday, 13th July (Mr. E. H. Wurst, Appila).

Each Conference will commence at 10.30 a.m. Papers and questions for the agenda of any Conference should be submitted about a fortnight before the date on which it will be held.

McLaren Flat Pruning Competitions—Friday 3rd June (Mr. G. R. Roe, McLaren Flat).

Overseas Wheat Quotations

By courtesy of the New South Wales Marketing Bureau, the South Australian Department of Agriculture is supplied regularly with statements showing overseas quotations for wheat to the nearest eighth of a penny. The accompanying table gives weekly quotations in the State or country of origin of the wheat, and months of shipment or delivery.

	Values elsewhere than in Sydney are expressed in English currency.								
Date of Quotation.	S. Aus. Wheat.	W. Aus. Wheat.	Manitoba No.3.	Argentine Wheat.	Karachi Choice White Wheat.	American Hard Winter Wheat.	White North Pacific Wheat.	Russian.	
1938.	*s.* *d.*	April. *s.* *d.*	May. *s.* *d.*	Mar.-April. *s.* *d.*	May-June. *s.* *d.*	Mar.-April. *s.* *d.*	Mar.-April. *s.* *d.*	Mar. *s.* *d.*	
Mar. 17 ..	—	4 4⅞	5 4	5 1½	4 2⅝	4 9¼	4 4⅞	4 4⅛	South Australia—(Sales afloat), 4s. 3⅜d.; New South Wales—(Sales afloat), 4s. 4½d.
Mar. 24 ..	Mar. 4 1⅛	4 2¼	—	April-May. 4 10½	4 1⅛	4 8¼	—	4 2⅝	South Australia—Shipment (April), 3s. 11¼d. New South Wales—Shipments (March), 4s. 0⅝d. and 4s. 1⅛d. Victoria—Shipment (April), in bags 4s. 1⅞d.
Mar. 31 ..	April. 4 2⅝	April. 4 3	May. 5 6¾	5 0⅜	4 1¾	4 8½	—	4 2⅜	Victoria—Shipment (afloat), 4s. 2⅜d.
April 7 ..	4 1⅛	4 1½	5 5¼	4 8¾	4 0⅜	4 5⅝	April-May. 3 11⅞	Afloat. 4 0¾	

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The Necessity for Superphosphate for Wheat Crops

[By R. C. Scott, Chief Agricultural Adviser.]

Experience in all districts of the State has shown that for maximum crop returns an application of superphosphate at seeding time is essential.

This is not surprising since the soils of the world are notably deficient in phosphoric acid, and under our conditions this deficiency can be made good most economically by the use of superphosphate. Not only is phosphoric acid an essential plant food, but it is of value in other directions. When present in adequate quantities it encourages extensive root development and hastens maturity, both points of advantage in low rainfall country and areas where hot weather comes in quickly. Moreover, the extra vigour given to young plants renders them more resistant to soil-born diseases, such as take-all, than would otherwise be the case.

No Cereal Crop should be Planted without Superphosphate.

Notwithstanding the fact that the value of superphosphate is well recognised, it is surprising to find that almost 15 per cent. of the area under crop in South Australia is seeded without manure. Such action is probably due to the financial difficulties of the land owners concerned, or because the area to be planted is situated in very doubtful rainfall country; but, whatever the reason, it is quite definite that in all instances the addition of superphosphate is economically a sound proposition, and every acre planted with cereals in this State should receive a dressing of phosphatic fertiliser.

Increased Dressings Advisable.

The mean application of superphosphate to wheat crops in South Australia is apapproximately 80lbs. to the acre. The heaviest dressings are given in the South-East, and slightly exceed 1cwt. to the acre, whereas in the Upper North and Eyre's Peninsula the average acre application is only about 60lbs. In order to determine the optimum dressing, much experimental work has been conducted throughout the State, and the mean yields from 153 trials carried out over a long period of years are as follows:—

	Bushels per acre.
No manure	11.13
½cwt. superphosphate	14.28
1cwt. "	15.57
2cwt. "	17.03

When calculated on the basis of 4s. per bushel for wheat and 4s. per cwt. for superphosphate, the most profitable return is obtained from the 2cwt. dressing. These figures clearly indicate that the average application for the State can be increased very materially, and reach at least 160lbs. to the acre—that is to say, double the present mean rate of manuring.

Variation in Application according to Rainfall.

The average rainfall has influence on the quantity of superphosphate that can be economically applied, and when the experiments are considered from this angle it is found that the optimum dressing for areas receiving less than 13in. of rain per annum is at least 1 cwt., and for districts where the annual precipitation exceeds 13in. at least 2cwt. of superphosphate per acre.

Order Full Supplies for the Coming Year.

It is strongly recommended that for this year's cropping superphosphate be secured on the basis of at least 1cwt. per acre for all land situated in areas of less than 13in. annual rainfall, and 2cwt. per acre for that placed in the wetter districts.

Superphosphate is never wasted, since when added to the land it is held tightly in the soil, and although available to plants is not washed out in drainage waters. Consequently, if it is not all used by the cereal crop, the residue remains to encourage pasture growth in subsequent years, thus promoting the development of more abundant and nutritious fodder for live stock.

The Baking Qualities of Bleached and Sprouted Wheats

In addition to the report on page 649 of the February issue on samples of wheat which were tested for milling and breadmaking qualities, Mr. A. J. Farquhar, A.A.C.I., Department of Chemistry, has submitted the subjoined report on a further sample (Ranee) from Roseworthy.

The effect of the rains was to improve the quality of this wheat although when milled the yield of flour was nearly 2 per cent. lower.

There was a marked increase in the protein content, wholemeal fermentation test figure, and maltose content.

The results of the baking tests showed a considerable improvement in loaf volume and general bread qualities in the "after rains" sample, but owing to the greatly increased maltose content, there was no response in the addition of malt and phosphate.

WHEAT.	Before rain.	After rains. (Shot grain.)
Moisture of wheat as received	9.5%	12.1%
Protein of wheat	11.9%	14.0%
Pelshenke Test	44 mins.	50 mins.
Flour yield	71.1%	69.3%
FLOUR.		
Protein	10.0%	12.2%
Mgms. Maltose per 10 grms. Flour	163	258
Water absorption	55.2%	56.5%

BAKING TESTS.	Before rain.		After rains. (Shot grain.)	
	Volume. mls.	Weight. grms.	Volume mls.	Weight. grms.
Basic	420	127.2	560	124.1
Plus 0.3% malt and 0.1% phosphate	440	126.3	560	122.4
0.3% malt + 0.1% phosphate and 0.001% bromate	375	126.9	485	124.6

Studies on the Effect of Weathering on the Commercial Value of Wheat Samples from the 1937-8 Harvest

[E. J. BREAKWELL, B.Sc.Agr.(Syd), Plant Breeder and E. M. HUTTON, B.Ag.Sc., Assistant Plant Breeder, Roseworthy Agricultural College.]

The extent of the damage, or otherwise, to the grain, caused by the heavy falls of rain which occurred in many districts, immediately preceding or during the last harvest is of vital interest to the miller, the baker and the producer.

The satisfaction which his flour gives to the baker is the primary concern of the miller, who endeavours to produce a uniform, first-class flour by skilfully blending the wheats at his disposal. From a financial point of view, the flour yield and the ease of milling are two of the most important technical characters looked for in the wheat bought by him, and he rightly prevents any monetary loss by purchasing samples which will give a normal flour yield, or by reducing his price for those which he suspects might return a yield below average.

The baker, at the dictates of the consumer, must produce a relatively large attractive loaf with a crisp brown crust and a silky, white, palatable crumb. The finished article is of primary importance, but the ease with which it is produced must be taken into consideration.

The dough should handle well on the boards, it must be reasonably fast in the troughs and should not require excessive doses of "improvers," or yeast foods. Above all, the flour should have a high water absorbing capacity, for just as percentage flour extraction and ease of extraction represent the margin of profit to the miller so does the water absorbing capacity of the flour represent a similar margin to the baker.

The producer is concerned with the millers' reception of his samples in so much that sprouted grain is subject to dockage. Bushel weight affects the number of bags and the amount of labour required, quite apart from the fact that the weight of the samples must come up to the f.a.q. standard.

Of interest also is the possible effect of the rain on the viability of the grain, for it has been suggested that the sprouting which took place in certain districts might influence appreciably the percentage germination of the seed sown in the coming autumn. The grower of sprouted grain is the member of the community who has suffered the greatest loss occasioned by the unseasonable weather. Growers of bleached wheat have experienced some loss, but at least, their samples command f.a.q. prices providing the weight is satisfactory.

The announcement by the Chamber of Commerce, in January, that sprouted grain might not receive f.a.q. prices, caused concern in some districts. The purpose of this paper is to outline the advantages and disadvantages of "shot" or "weathered" grain from the millers' and bakers' viewpoint, so that the reason for the dockage might be more fully understood by the wheatgrower.

Studies on the milling and baking qualities and germinating capacity of sprouted grain have been pursued in other parts of the world and recently in Sydney and Adelaide by the respective Departments of Chemistry. Results are not always in agreement, and thus an endeavour has been made in this article, to summarise previous work and to collate this summary with results obtained at Roseworthy College from a range of samples which have been tested at that centre.

Review of Literature.

Bailey(¹) summarises the study performed on sprouted grain prior to 1925. The following indisputable facts are revealed:—

1. There is an appreciable loss of weight of grain on sprouting.
2. The percentage of sugars in the grain increases progressively with sprouting.
3. The acidity of the flour increases with sprouting.
4. The yield of flour from sprouted samples is lower than that from sound samples.
5. The quantity of gas generated in dough made with flour from sprouted wheat is greater than that produced in dough from unsprouted wheat flour.
6. Flour milled from sprouted wheat has a consistently lower water absorption than flour milled from normal or unsprouted wheat.
7. Progressive sprouting causes a corresponding decrease of the dry gluten but not necessarily of the protein content of the flour.

Most of the milling and baking studies from which the above conclusions were derived were conducted with samples which were sprouted to a greater extent than was any South Australian sample from the 1937-38 harvest and some of these conclusions may not be applicable to very lightly sprouted grain.

Swanson(²) has shown that the sugar content and diastatic activity in wheat are not influenced unless the amount of moisture is sufficient to start the process of germination. Lightly bleached wheat, therefore, should produce a flour identical with that of a normal sample.

Kent Jones(³) considers that, from a baking point of view, flour from sprouted wheat can be very hard to handle if the diastatic activity is excessive. The main effects of too much diastase are:—

1. The dough becomes sticky and even tends to run.
2. The bread is difficult to bake.
3. The crust colour becomes too pronounced.
4. The crumb is unduly soft and sticky and the loaves may tend to collapse as they are taken from the oven.

Although laboratory methods are not strictly comparable with those of a commercial baking house, cereal chemists in Australia, working with home grown wheat, have not remarked on the undesirable characters cited by Kent Jones. The difference in conclusions is no doubt due to the degree of sprouting. Samples seriously sprouted are rare in Australia.

Cayzer(⁴) attempted the first study with bleached and weathered samples of Australian wheats and he notes a better dough quality, greater loaf volume and improved symmetry and crumb colour. He attributes these improvements to the better maturity of the flour of the bleached samples, a contention with which, in the light of results obtained at Roseworthy, the authors cannot be reconciled. He also states that water absorption and crust colour are unchanged. This also is not in agreement with Roseworthy results.

Farquhar(⁵), working on a range of samples similar to that studied at Roseworthy gives conclusions which are comparable to those arrived at by the authors. Minor differences in analytical tests conducted on identical samples occur but such differences are of little importance being due to the technique used at the two centres. The general order of results is similar.

Material and Methods at Roseworthy.

Two series of wheats were studied; the first representing samples from the College farm harvest and the second from plots conducted by Mr. J. Cass of Pyap in the northern Murray Mallee. The following varieties were tested:—

Roseworthy—King's White, Nawab, Dundee, Ford, Ranee.

Pyap—Baringa, Pusa 4, Merredin, Dundee.

These represent a wide range of types including, as they do, varieties which are held in high repute by millers and bakers, as well as some which have indifferent quality. Samples of each variety were taken from bags harvested before and after the rains and are therefore directly comparable, with the exception of the Ford from Roseworthy, the normal and the bleached grain of this variety coming from different paddocks. The Roseworthy samples were more weathered than those from Pyap, the latter being badly bleached but not "sprouted." Ranee was the variety most seriously affected by the weather, judging on appearance, followed by Dundee, Nawab and King's White. The Pyap samples appeared to be about equal in this respect.

Moisture, protein and wholemeal fermentation time estimations were determined by the standard methods. Maltose determinations were made by a modification of the Blish-Sanstedt as outlined by Hickinbotham(6).

A different method of baking from that usually employed was used. At the outset, it might be stated that the authors are of the opinion that the Canadian baking test is quite unsuitable for South Australian wheats, the various treatments being too severe and the times between the punches and in the tin being too short to allow the full development of most doughs. Three loaves were made in the Roseworthy series of tests. The first was a short fermentation, the dough being tinned when it had reached its optimum development. The second loaf received one punch and the third loaf two punches. Punching and tinning were carried out on each dough when it was almost "worked out." This was ascertained by the simple procedure of prodding with the finger. When the dough exhibited just a very slight spring it was considered to be ready for punching, tinning or the oven, according to the stage it was in. Each dough was treated on its merits and no definite time was adhered to. The first loaf would represent a baker's loaf and the second and third loaves give some idea of tolerance and diastatic activity. Salt, sugar and yeast were the same as in the Canadian baking test. The 300grms. of flour were mixed in one batch. Because of the larger dough there was less danger of chilling, mixing in the Hobart mixer was easier and more thorough and water absorbing capacity would be more accurately assessed than with a 100grm. sample. After each punch, 150grms. of dough were scaled off and tinned. The three loaves from each variety were therefore directly comparable as they received exactly the same mixing and handling. With the Pyap samples, the long fermentation was discarded and the final two loaves were tinned after the second punch. One loaf was placed in the oven when it was "ready" and the other went in one hour later and was consequently overwrought. The ability of a dough to stand up to this extra hour of fermentation is considered to be related to fermentation tolerance.

Bushel Weight.

Farquhar(5) has already published figures showing the loss of weight in weathered grain. This loss was as much as 8lbs. in the case of King's White from the College. Bushel weights of the Pyap samples are hereunder together with the moisture content of the grain:—

Wheat.	Bushel Weight.	Moisture % Content.
Pusa 4 Normal	65	8.20
Pusa 4 Weathered	59	8.43
Merredin Normal	63½	8.38
Merredin Weathered	59	8.54
Baringa Normal	64	7.94
Baringa weathered	59	8.65
Dundee Normal	62	7.80
Dundee Weathered	59	8.44

It will be noticed that, although the weathering was lighter than in the case of the Roseworthy samples, the loss of bushel weight of the wheats from Pyap was just as pronounced. There was a small but significant difference in the moisture content. At Roseworthy the weathered samples contained up to 2 per cent. more moisture than the normal ones. The drier the grain the more water can be added by the miller for conditioning and thus the increase in moisture content, in weathered grain is a defect.

Flour Yield.

Cayzer(4) states that the milling process is facilitated by light bleaching. More severe bleaching may cause a slight decline in the flour yied in the case of soft wheats and make milling more difficult, but hard wheats which are weathered, are easy to mill and produce a higher yield of flour. Farquhar(5), however, shows a barely significant decline in flour yield with most wheats and a pronounced decline in the case of King's White.

At Roseworthy, the samples were not milled right out but in order to test ease of milling, were milled and sifted for a definite time. In that time the following flour extractions were obtained.

Roseworthy Samples.	Percentage Extraction.	Pyap Samples.	Percentage Extraction.
Nawab Normal	61.5	Pusa 4 Normal	62
Nawab Weathered	57.5	Pusa 4 Weathered	65
King's White Normal	62.6	Merredin Normal	68
King's White Weathered .. .	53.2	Merredin Weathered	68
Dundee Normal	63.4	Baringa Normal	63
Dundee Weathered	58.9	Baringa Weathered	63
Ranee Normal	63.0	Dundee Normal	71
Ranee Weathered	61.7	Dundee Weathered	68
Ford Normal	66.3		
Ford Weathered	65.0		

Any comparisons between experimental and commercial mills are of doubtful value, but it would appear from these figures that, through weathering, the soft wheats are rendered more difficult and flinty wheats easier to mill, with the exception of Dundee. Dundee has a much thicker bran under South Australian conditions than either Baringa or Pusa 4 and this might explain the discrepancy. It is known, however, that certain millers who are handling a limited quantity of weathered grain are quite satisfied with its behaviour and have encountered no difficulties in milling it. Cayzer's statement regarding the milling qualities of bleached wheat has been criticised in milling circles but has not been refuted. Indeed it has been admitted that Cayzer's conclusions have been known to a number of technical mill managers for some time.

Providing that the baking quality of the sprouted sample is satisfactory, and this paper will show that it usually is, why should a sprouted sample be subjected to dockage? Since the publication of Cayzer's article a number of farmers have been asking this question.

As Jelfs(7) states, a high moisture content such as is found in most samples of weathered grain gives trouble in storage and milling. At the same time, weathered samples from hot districts such as those from Pyap, show a moisture content lower than f.a.q. and on the moisture basis could not very well be docked by the miller. Weathered samples from cooler districts should, of course, be viewed with suspicion. Samuels(8) states that a buyer has the right to refuse a weathered sample because it is inferior in appearance to f.a.q. and to quote this writer's words—"with any given sample of a light weight bleached wheat it would be difficult to decide whether it was of a satisfactory weight before bleaching—and wheat that was light weight for reasons other than bleaching indicated low milling quality." This is a sound argument. If it were possible for millers to buy on the basis of variety and district they could and would not doubt exert more discretion in the matter of dockage, but buying as they do, bulk lots of more or less unknown origin, they have to err on the safe side and subject badly-weathered samples to the maximum dockage. Merchants likewise, who sell on the world's markets, have to be very careful in buying grain of inferior appearance. That is the present position and it must be conceded that buyers are perfectly justified in refusing or docking weathered grain even though it might appear to the casual observer that the farmer sometimes gets the worst of the deal, for it cannot be denied that many weathered samples are in no way inferior to normal samples. This, however, is the fault of the system rather than any buying group; there are various degrees of bleaching and weathering and a clear line of demarcation must be drawn somewhere. In South Australia, at present, only "sprouted" grain is barred from f.a.q. This, in the authors' opinion, is much fairer to the farmer than the exclusion of all bleached wheat, for it is considered, in the light of laboratory experience and opinions from millers and bakers, that the milling and baking advantages of wheat merely bleached, outweigh its disadvantages. Higher moisture content, poor appearance and, as is often the case, the presence of stained grains which impart a dingy colour to the flour are defects of weathered samples which certainly warrant dockage. If the sample is only "bran-bleached," particularly when it was grown in a hot district, it should be considered, to all intents and purposes, in no way inferior to a normal sample.

Physical and Chemical Tests with the Whole Grain.

The following table gives the wholemeal fermentation time tests, percentage protein and maltose figures of the varieties under review:—

Roseworthy Samples.	Wholemeal Fermentation Time.	Percentage Crude Protein Moisture Free basis	Milligrams of Maltose produced. in 1 Hour from 10 grams of Wholemeal.
King's White Normal	48	15.50	110
King's White Weathered	54	15.03	168
Nawab Normal	37	11.66	130
Nawab Weathered	48	12.96	240
Dundee Normal	123	13.60	194
Dundee Weathered	128	13.09	340
Ranee Normal	57	13.60	162
Ranee Weathered	66	13.09	207
Ford Normal	97	15.24	107
Ford Weathered	94	11.05	170
Pyap Samples.			
Baringa Normal	35	12.72	194
Baringa Weathered	37	10.52	275
Pusa 4 Normal	110	13.30	220
Pusa 4 Weathered	60	11.35	253
Merredin Normal	52	11.25	149
Merredin Weathered	56	11.38	142
Dundee Normal	113	13.21	180
Dundee Weathered	97	13.20	178

The wholemeal fermentation time figures of the weathered samples are generally higher than those of the normal ones, whilst the reverse is usually the case with the protein percentages. This suggests that an improvement of the protein has taken place in the weathered samples. Maltose produced is significantly higher when the grain has been weathered. As Farquhar(5) points out, this is a very important consideration with Australian wheats for most of them are low in diastatic activity.

Baking Tests.

ROSEWORTHY SAMPLES.

King's White.—The flour from the "normal" sample mixed into a dough easy to handle, but which exhibited signs of weakness after the first punch and was rather low in gassing ability. The crusts of the second and third loaves were pale and anaemic and the crumb structures of all loaves were coarse and open with very little pile. The doughs would have to be baked very green to give a satisfactory texture. The dough from the flour of the weathered grain of King's White was vastly superior in all respects. Although a bit short, it was silky and firm and showed very good gassing at all stages. The crust colour of the loaves was richer and the crumb slightly better than with the loaves from the normal grain. The differences in volume were not marked. Farquhar (5), working on much the same samples, reports a great difference in loaf volume, the weathered sample being vastly superior in this respect. The dough from the King's White normal was much slower than that from the weathered grain, consequently the former doughs would be very green when they went into the oven under the Canadian Baking Test procedure and would not give their maximum volumes.

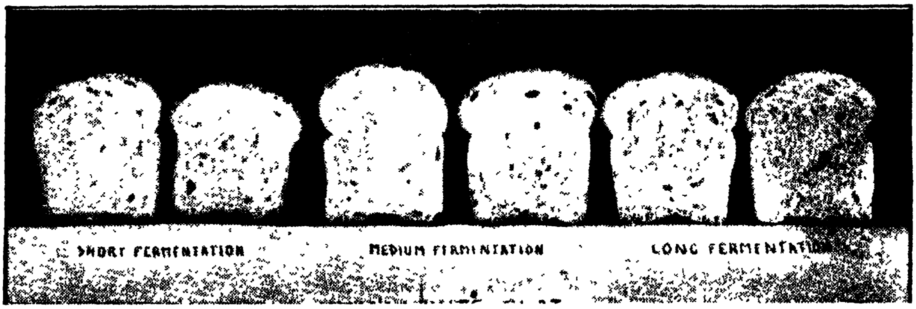

Figure 1.—Loaves from King's White, normal (on left) and weathered samples.

Sample.	Water Absorption.	Volumes in c.c.'s. Short Fermentation.	Medium Fermentation	Long Fermentation.
King's White Normal	53	420	425	390
King's White Weathered ..	52	380	415	410

Nawab.—By weathering, this wheat changed from one with really deplorable baking quality into one which should be quite acceptable to the local trade. Figures 2-4 clearly demonstrate this point. The "normal" dough was runny and not only lacked gassing ability but became "worked out" very quickly. The loaves were flat and sodden and the crusts anaemic. The addition of yeast foods and improvers had little effect on the volumes. On the other hand, the "weathered" dough worked and gassed well and produced well-piled loaves with attractive crusts and superior crumb structure although they were still not good in this character.

Sample.	Water Absorption.	Volumes in c.c.'s. Short Fermentation.	Medium Fermentation.	Long Fermentation.
Nawab Normal	53	240	250	275
Nawab Weathered	52	350	360	365

The Nawab grain from the 1936 harvest was bright and plump and yielded a flour with the same baking characters as the Nawab "normal" of 1937, except that it gave loaves with a slightly superior volume. (Figure 5.)

It is difficult to attribute differences of the above order to increased "maturity" of the flour from the weathered grain. Both flours were five weeks old when baked and the differences in the behaviour of the doughs was certainly not due to increased diastatic activity, for malt supplements had little effect on the loaves. The difference obviously lay in the gluten and it would appear that the weathering had been sufficiently severe to cause the proteolytic enzymes in the grain to modify the gluten.

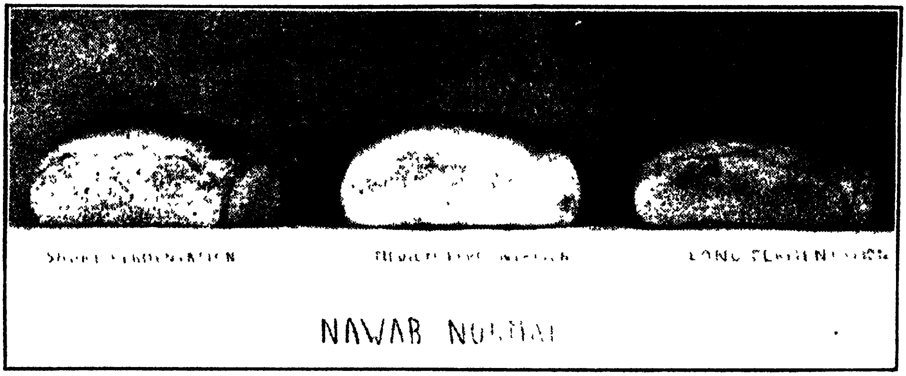

Figure 2.—Loaves from Nawab, normal.

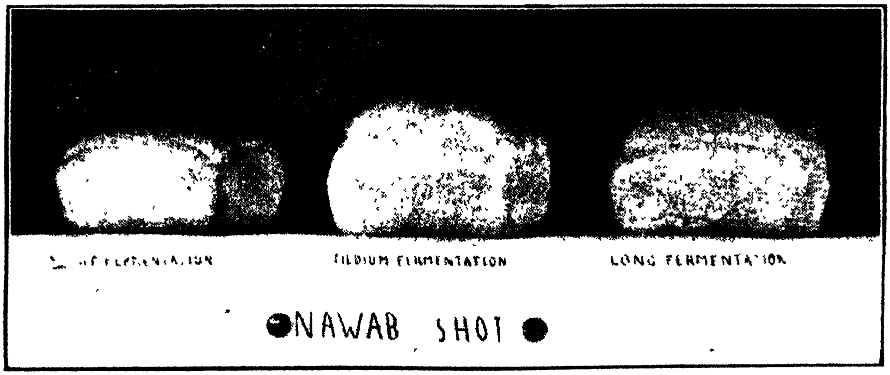

Figure 3.—Loaves from Nawab, weathered.

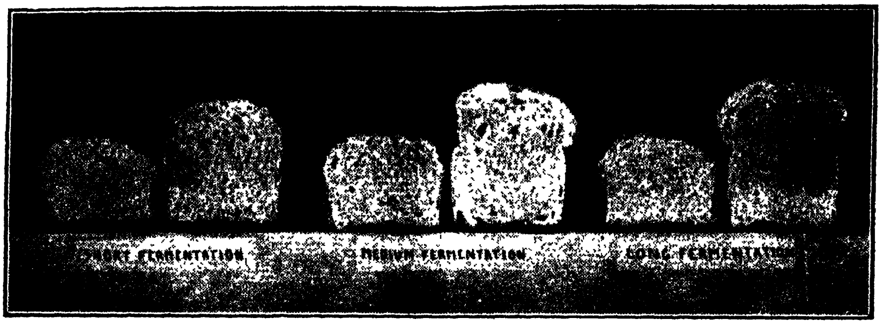

Figure 4.—Loaves from Nawab, normal (on left) and weathered samples.

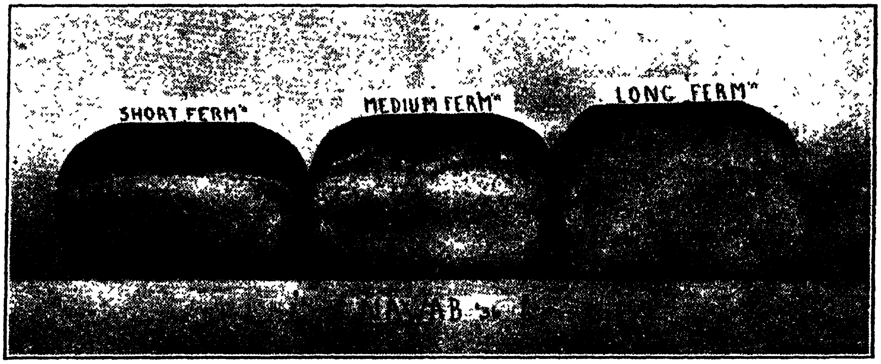

Figure 5.—Loaves from Nawab, 1936 harvest.

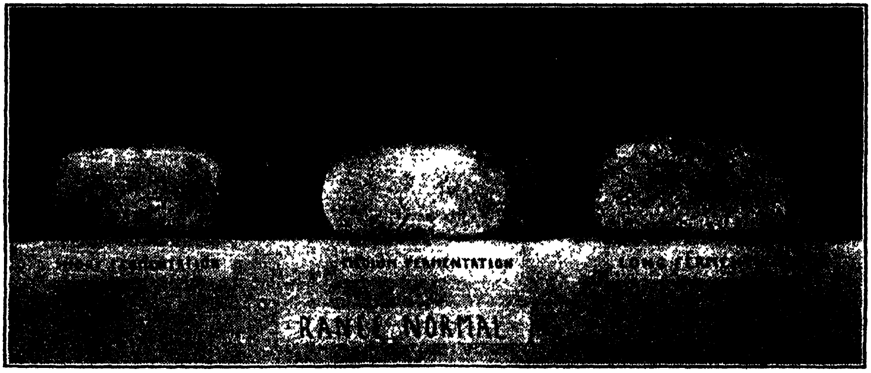

Figure 6.—Loaves from Ranee, normal.

Ranee.—The remarks on the Nawab samples can be applied to Ranee except that the loaves from this variety were better throughout. (Figures 6-8.)

Sample.	Water Absorption.	Volumes in c.c.'s. Short Fermentation.	Medium Fermentation.	Long Fermentation.
Ranee Normal	58	410	380	385
Ranee Weathered	56	480	580	545

The weathered wheat produced an excellent bakers' dough whilst that from the normal was rather mediocre.

Dundee.—Both the Dundee doughs handled excellently, being silky and firm. They were rather slow to mature. Crumb colour and texture were good in nearly all loaves, the chief difference between the normal and the weathered being the better loaf volumes with the latter.

Sample.	Water Absorption.	Volumes in c.c.'s. Short Fermentation.	Medium Fermentation	Long Fermentation.
Dundee Normal	56	390	350	360
Dundee Weathered	53	455	450	400

The loaf volumes were rather poor for this variety, but they could, no doubt, be increased by the addition of "improvers."

Ford.—As the Ford samples came from different paddocks, a comparison cannot be drawn. There are indications, however, that in spite of the increased diastatic activity, Ford is not improved by weathering. Cayzer(4) has already noted this.

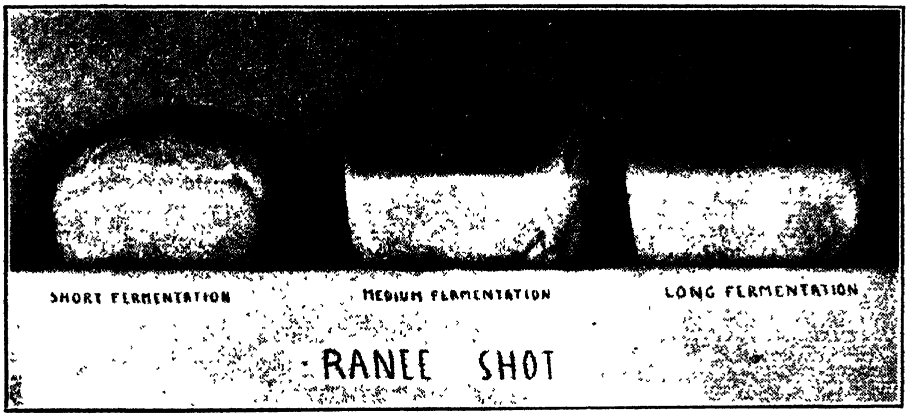

Figure 7.—Loaves from Ranee, weathered.

Pyap Samples.—These wheats did not exhibit such large differences between the normal and weathered samples as did those from Roseworthy, probably because the weathering was less severe.

Baringa put up a very poor performance, as is usual with this variety. Merredin, contrary to expectations, handled and baked well though the crusts were usually blown. As the photographs illustrate, all loaves were slightly overwrought, being given a little longer in the fermentation cabinet than is usual. (Figures 13-16.)

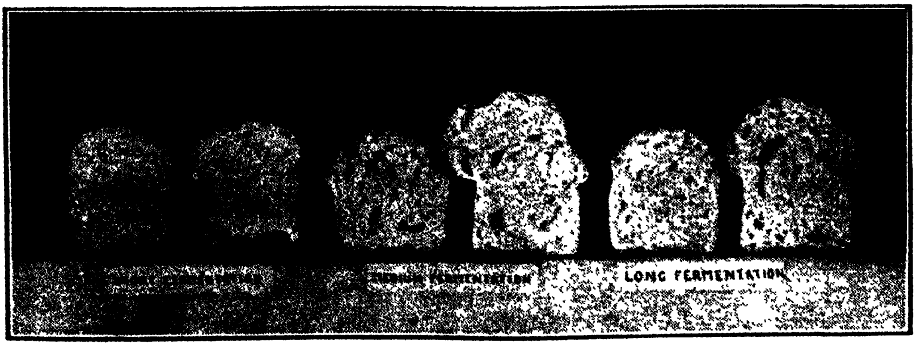

Figure 8.—Loaves from Ranee, normal (on left) and weathered samples.

		Volumes in c.c.'s.		
Sample.	Water Absorption.	Short Fermentation.	Medium Fermentation	Overwrought. Dough.
Baringa Normal	58	420	375	410
Baringa Weathered	55	470	425	520
Pusa 4 Normal	60	435	415	490
Pusa 4 Weathered	57	510	465	550
Merredin Normal	54	520	500	515
Merredin Weathered	53	510	500	530
Dundee Normal	58	470	405	500
Dundee Weathered	55	465	450	535

The peculiar feature about these loaves was that, in general, the crust colours of the loaves from the normal samples were superior to those from the weathered grain. This is in direct contrast to results from Roseworthy samples.

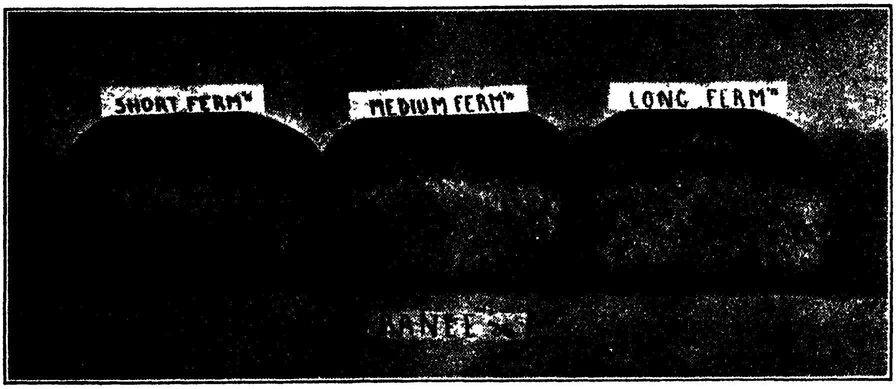

Figure 9.—Loaves from Ranee, 1936 harvest.

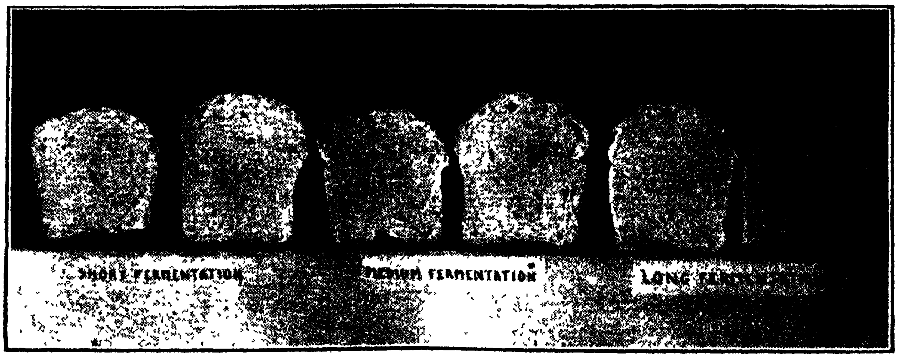

Figure 10.—Loaves from Dundee, normal (on left) and weathered samples.

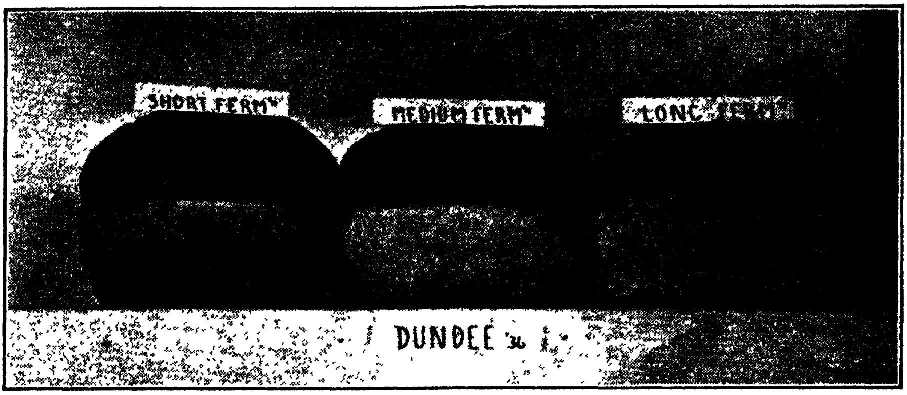

Figure 11.—Loaves from Dundee, 1936 harvest.

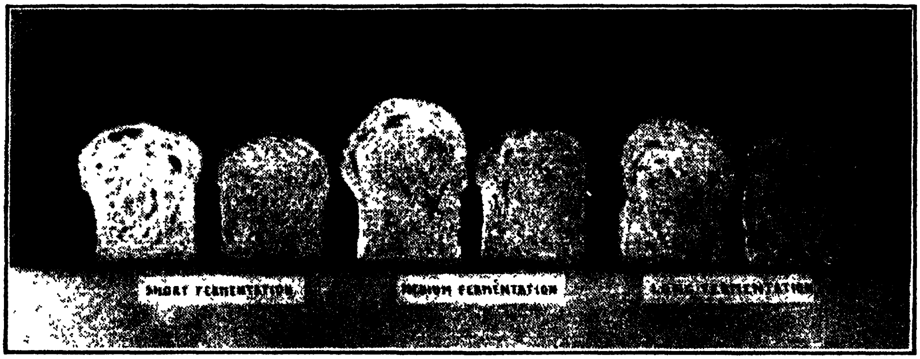

Figure 12.—Loaves from Ford, normal (on left) and weathered samples.

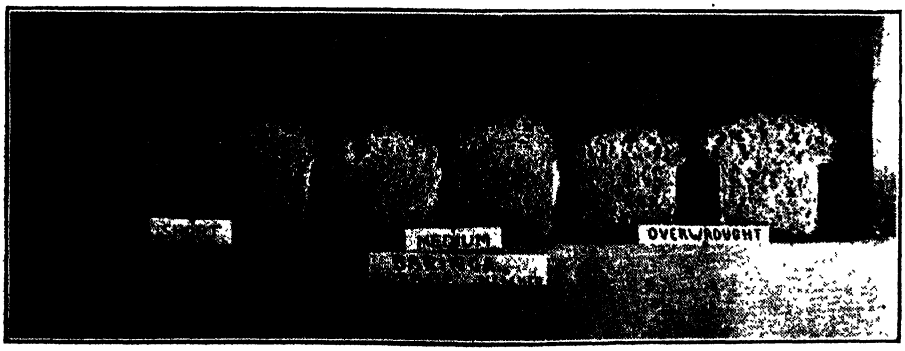

Figure 13.—Loaves of Baringa, normal (on left) and weathered samples. Grown at Pyap.

General Conclusions from Baking Tests.

1. Weathered samples produce flours with a consistently lower water absorption than those of flours from normal samples.
2. The doughs from weathered samples have superior handling qualities and generally gas better.
3. Crust colour may or may not be improved by weathering. This appears to depend upon the degree of weathering.
4. Loaf volume, crumb structure and crumb colour are generally improved by weathering.

From the bakers' viewpoint therefore, apart from the factor of lower water absorption, flours from bleached and weathered wheats are quite desirable, provided, of course, the grain has not been weathered to such an extent that the colour of the flour is impaired, or the diastatic activity so high that the dough "runs" on the boards.

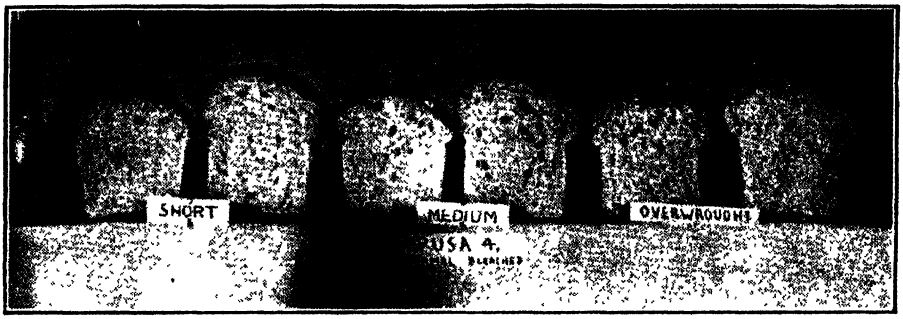

Figure 14.—Loaves of Pusa 4, normal (on left) and weathered samples. Grown at Pyap.

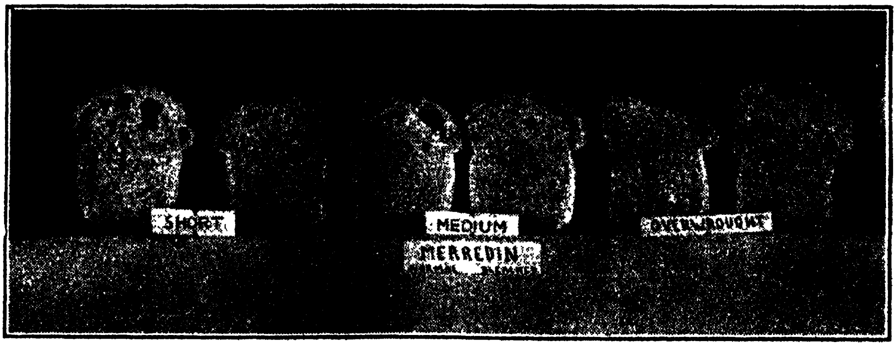

Figure 15.—Loaves of Merredin, normal (on left) and weathered samples. Grown at Pyap.

Germination Studies.

It was noticed at Roseworthy that samples harvested after the rains contained up to 10 per cent. of grain which had "shot." The skin of such grains had been ruptured around the embryo and the plumule had emerged, though only slightly. Samples were handpicked into three classes—

1. Grain only bleached.
2. Grain with swollen embryos.
3. Grain which had "shot."

Germination tests were conducted with the three groups on 10th December, 1937, and again on 11th March, 1938. The grain was placed on moist cotton wool in dishes and thus given ideal germinating conditions.

Variety.	Bleached.			Swollen.			Ruptured.		
	No. per Head.	Percentage per Head.	Percentage Germinated.	No. per Head.	Percentage per Head.	Percentage Germinated.	No. per Head.	Percentage per Head.	Percentage Germinated.
Germinated 10th December, 1937.									
Dundee	Nil	—	—	17·5	75·8	99·5	5·6	24·2	100
Ranee 4H ...	10·3	53·3	97·7	4·6	23·7	96·5	4·5	23·0	100
Baringa	16·7	67·7	100·0	4·8	19·3	98·3	3·2	13·0	100
Sword	5·5	22·7	94·2	10·8	44·2	97·0	8·0	33·1	100
Bencubbin ..	12·4	67·6	100	7·5	34·6	96·8	1·6	7·8	100
Germinated 11th March, 1938.									
Dundee	—	—	—	—	—	98·6	—	—	100
Ranee 4H ...	—	—	99·2	—	—	100	—	—	96·4
Baringa	—	—	94	—	—	100	—	—	100
Sword	—	—	95·6	—	—	98·5	—	—	100
Bencubbin ..	—	—	98·7	—	—	97·8	—	—	100

It will be noticed that, with these varieties at least, viability was not affected by weathering. *With this series, however, the grains were rubbed out from the heads by hand and were not damaged.*

"Shot" grain, after it had been through the harvester, the grader and the pickler, sometimes loses its embryo altogether. Approximately 1 per cent. of the grains of weathered samples were thus affected.

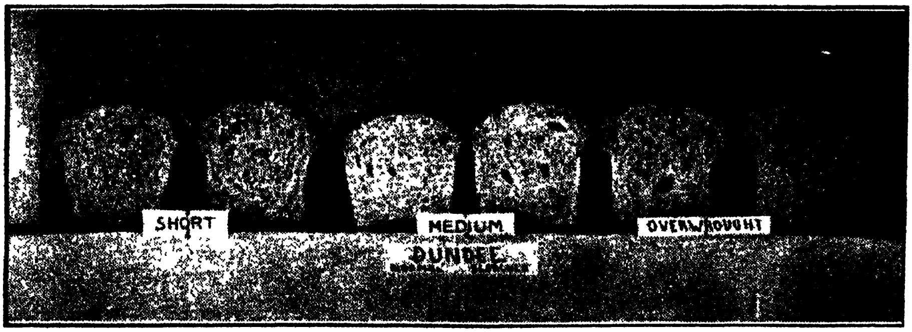

Figure 16.—Loaves of Dundee, normal (on left) and weathered samples. Grown at Pyap.

In order to determine whether viability had been impaired by handling, germination tests, *under field conditions,* were conducted with a number of varieties which had been harvested with a machine, graded and pickled. In this series of tests also, "ruptured" grains were picked out and tested separately.

Sample.	Percentage Germination.
1. Dundee sprouted, graded and pickled	49
2. Dundee weathered, graded and pickled	83
3. King's white sprouted, graded and pickled	49
4. King's White weathered, graded and pickled	78
5. King's White normal, graded, not pickled	92
6. King's White normal, graded and pickled	92
7. Ranee sprouted, graded and pickled	79
8. Ranee weathered	98
9. Ranee normal, untreated	93
10. Huguenot weathered, graded	60
11. Huguenot sprouted	30

Germination tests conducted on 15th March, 1938.

It will be seen from these figures that there was an appreciable decrease in viability in the weathered samples of most varieties. This bears out the contention of Callaghan (9), who, in a recent publication, warned farmers who intended to sow weathered grain to increase the seeding rate to compensate for this loss of viability. The figures also demonstrate the danger of taking laboratory germination tests as accurate, for there was a big discrepancy in results obtained from field germination tests and laboratory tests at Roseworthy. Sprouted grains will also be more liable to malting, which will accentuate the need for increased seeding rates. At Roseworthy, in the coming Autumn, weathered samples will be sown at 90lbs. per acre, which is approximately 15lbs. per acre more than the usual rate. Farmers who have weathered grain which shows signs of sprouting, would be well advised to increase their rates of seeding proportionately, particularly if the seed bed is at all dirty.

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Yorkshire Fog Grass (*Holcus lanatus*)

[R. Hill (District Agric. Adviser).]

Described as an erect, softly villous perennial, Yorkshire Fog Grass as a pasture plant has been the subject of much discussion in the State during recent years.

Throughout the high rainfall districts, where pasture improvement is making steady progress, it is spreading rapidly and causing some concern amongst landholders, but is there any need for alarm?

Having given the subject much thought, it is the considered opinion of the writer that there is no fear of the grass getting out of control if managed correctly, and, furthermore, it is predicted that in the near future it will be accepted by the best grassland farmers as second only to Perennial Rye Grass in advanced pasture work under these conditions. On raw, virgin soils it has no rival, and quickly develops a strong, vigorous plant, capable of producing excellent grazing, provided it is not allowed to make stalky growth.

In Great Britain, where numerous grasses superior in quality can be grown with certainty, Yorkshire Fog has been discounted in value, and English prejudice has been responsible for the delay in accepting it as a useful pasture plant in this State.

Let us analyse it under local conditions and examine the methods of management adopted by grassland farmers who condemn and those who appreciate its worth as a pasture plant.

Throughout the high rainfall districts of the "Hills Country," Yorkshire Fog Grass is very much in evidence, being stalky and not readily accepted by livestock, resulting in its rapid multiplication, which alarms the owner who has failed to understand the finer points of pasture management.

Although prepared to admit that greater palatability can be claimed for many grasses, it is maintained that any difference in that respect has been exaggerated, and in the search for suitable pasture plants the ability to improve palatability by correct management has been discredited.

Where rotational grazing is practised and pastures are grazed systematically, Yorkshire Fog combines with Perennial Rye Grass and Subterranean Clover to make a satisfactory mixture in some of the best permanent pastures, and its ability to make rapid growth is appreciated under these conditions.

The plant matures earlier than most pasture grasses, and if needed for hay, early cutting is essential to prevent seeding and loss of nutrition.

During the last few years some of the best meadow hay inspected has contained a high percentage of Yorkshire Fog, but on the other hand, some has been lowered in value because the grass had been cut when too mature.

On virgin land it has no peer as a pasture grass, provided it is kept well grazed, and it first attracted my attention for that purpose some 15 years ago at Mr. D. R. Lade's property on Kangaroo Island. From that time I have advocated its use on newly cleared land in the high rainfall districts, and this year the outstanding demonstration of its value for that purpose was witnessed on Mr. Ray Bishop's property at Mount Compass, where on roughly prepared virgin land it has been heavily grazed to carry approximately two sheep to the acre and has kept them in splendid condition.

In a recent visit to the property it was difficult to detect a plant that had run to seed, and fresh, apparently palatable growth appeared with each rain of any consequence.

It is possible that my support of this pasture plant will arouse adverse criticism, but this article in support of Yorkshire Fog Grass has been written after serious consideration, and with the hope that its value under correct management will be recognised.

Yorkshire Fog Grass (*Holcus lanatus*).
From *Grasses of the United States* (A. S. Hitchcock).

Wireless Talks

Harvesting and Packing Apples for Export

Address broadcast on 28th March, through 5CK, by Mr. E. Leishman (District Agricultural Adviser).

It is proposed to deal briefly with this subject under the following headings:—

1st—Maturity of the fruit.
2nd—Harvesting.
3rd—Preparation for packing.
4th—Grading and sizing.
5th—Packing and wiring.
6th—Labelling and stencilling of cases.

Maturity of Fruit.

There is not any set time to harvest apples, because climatic conditions influence the time of ripening. The maturity of the apples this season is approximately two weeks earlier than in normal years. This has been a decided advantage for the early shipments. The fruit must be in such a condition that on arrival at the overseas port it is hard, crisp, and juicy. Immaturity results in tough, flavourless, and often wilted fruits, and when too matured the condition is soft, floury, and subject to breakdown and rots. Practical guides for ascertaining the maturity of apples for export are:—

1. The seeds or pips changing to a brownish-black colour.
2. The ground colour showing signs of changing.
3. Tasting the apples to determine sugar content.

The best practical guide for picking is the ground colour of the fruit. When the apple approaches maturity this colour shows signs of changing to a lighter shade. This makes an effective guide if used intelligently.

Trees carrying light crops of apples generally mature earlier than when the yield is heavy, and the orchardist is tempted, if supplying an early shipment, to pick from these trees. This class of fruit should not be shipped, because its storage life is short, and various storage disorders occur. The Cleopatra variety, which is susceptible to bitter pit, should not be picked until the ground colour shows a slight change—having a tinge of yellow. Jonathan, which is a quick maturing variety, should not be advanced when picking, because breakdown often occurs, especially in the larger sizes. It is generally in the early varieties, when shippers are endeavouring to supply parcels for early ships, that immature apples are picked.

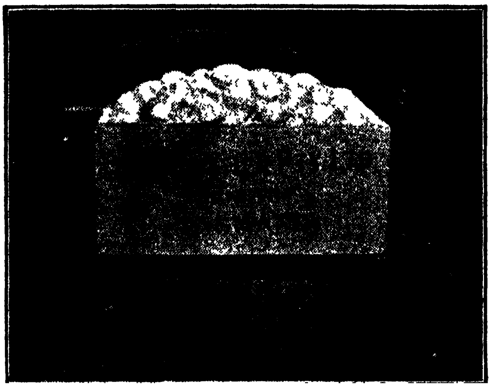
Harvesting.

A considerable amount of avoidable damage is done to fruit by rough and unskilful treatment during picking operations. It is important in the picking of apples to avoid undue pressure when grasping the fruit by the fingers and thumb. The apple is easily severed at the junction of the stalk by an upward and downward movement. If pulled or twisted, the stalk may be pulled out, probably causing damage to the skin, which leaves an opening for decay.

Bruising caused in harvesting very often is not apparent until a later stage. Unsuitable receptacles for picking cause a considerable amount of bruising. Picking bags are the most popular in harvesting. These are slung from the picker's shoulders, and have the advantage that both the operator's hands are free. The bag should not be filled to the fullest capacity, because overloading causes considerable bruising, particularly when picking the fruit with the use of a ladder. When emptying the bag into the picking box special care should be used. "Petrol" cases are a suitable picking box, but users of these receptacles should avoid overfilling.

Preparation for Packing.

In all co-operative and private packing houses all equipment should be in good order before the commencement of harvesting. Trial runs should be made of the machinery that will be used, so that no delay occurs; packing for export is a rush job, and stoppages cause considerable delays. It is very important in all packing houses that provision be made to obtain the maximum amount of light on the sorting table of the grader. When fruit is stacked in the packing shed it often obscures the light from the wall windows. Skylights should be provided to overcome this possibility. If the building is insufficiently lighted it is very trying on the eyes of the operators, and makes it impossible for them to grade the fruit efficiently. For night work and dull days artificial lighting is essential, making special provision for the sorting table.



"Crown Pack" of Winter Cole Pears.

Grading and Sizing.

In large packing houses and a number of the smaller ones machinery is installed to size the fruit, and is recognised as an indispensable part of the packing equipment.

I had the opportunity recently to inspect a number of packing houses in Tasmania, where two types of sizing machines are favoured. In one, the separation is determined by weight, and the other by the diameter of the fruit. Both types of machines appeared to give satisfaction. In one of the progressive packing houses I was impressed with the care and attention devoted to preventing any apples under grade requirements reaching the packing bins. There were four sorters on each side of the sorting table, and practically every apple was handled.

Grading should not be confused with sizing, for the former cannot be done mechanically. To obtain efficient grading of the fruit, it is necessary to have skilled sorters, as this is one of the most important positions in the packing house.

Sizing machines of either type must be set as accurately as possible, so as the packers are able to place sufficient fruit in the box without bruising.

Packing and Wiring.

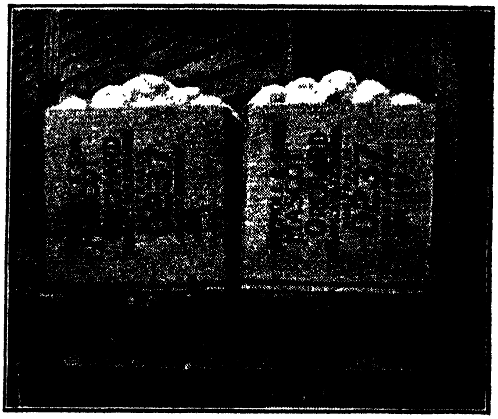
The usual system of packing adopted in this State is known as the "straight pack." This is the standard method of packing, and has been mostly practised since the inception of this standard box. The difficulty has been that the case when packed had either too much or too little "bulge." This has been principally due to the incorrect sizing of the fruit, and when placing the fruit in the boxes a firm downward pressure is made all over the fruit after every layer, or no pressure at all throughout the pack. This results, in many instances after the last layer has been placed, that instead of having the required bulge, the top is practically flat. When too high, over pressing and dumping is necessary to fix the lids, and consequently bruising occurs. On the other hand, if the bulge is too low, complaints are made by the merchants overseas that the boxes are under the recognised weight.

To overcome this, and to keep up to the standard of our competitors, it has been necessary to revise the present method and encourage the "American Crown Pack."

The "Crown Pack" is very simple to the packers; it is not a case of learning a new method, but of breaking off old habits, particularly in regard to the pressure of fruits in the box.

It can be mastered by a few hours' practice. This pack is so named because the fruits are built up in the form of a "crown," the highest in each layer being in the centre of the box. The usual straight pack is adopted, and to obtain the "crown" it is necessary to apply a firm downward pressure on the side apples, in addition to those at the end of each layer, when placing the fruit in position.

The remaining fruits are placed without this pressure, which results in the gradual building of a "crown" throughout the pack. It is not necessary to select slightly smaller apples for the end and side positions. The more even the sizing of the fruit the better the crown will be.



"Crown Pack" of Jonathan Apples, 175 count.

It is essential that efficient lidding presses should be used for nailing down the boxes in this or any other system of packing. Severe bruising will occur if the lids are nailed to the cases on the packer's bench. Slightly longer lids are necessary to allow for the bulge. A unitised lid is more conveniently applied to the case.

The wiring machine has proved an economical means of strapping cases. It makes the package more secure in transit and lessens the possibility of pilfering the fruit. The important points in wiring the case after lidding are to keep the wires close up to cleats and to have the correct tension on the wiring.

Labelling and Stencilling.

There is a number of attractively printed labels used, and a neat simple design is favoured. Labels poorly applied to the box have a most unsightly appearance. Use the best quality paste. To prevent bubbles forming on the labels, before they are fixed to the box soak the labels in water prior to applying the paste. When using a rubber stamp on the labels to designate the variety and count, see that it is distinct and place neatly in the allotted space. The usual practice is to label the boxes before they are packed, sufficient time being allowed for the labels to dry, because they are liable to be defaced during handling.

If shippers desire practical demonstration of the "crown pack," application to the Horticultural Branch of the Department of Agriculture would secure the services of a packing instructor.

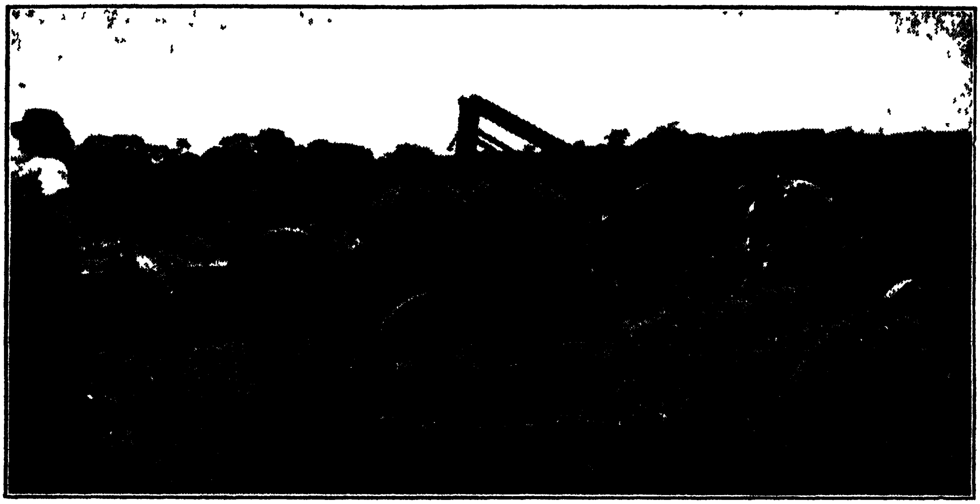
Pastures

An address by Rowland Hill, District Agricultural Adviser, and broadcast through Station 5CL.

Natural pastures have been a valuable asset to South Australia, but with time and the general development of the cultivated areas, grassland farming with introduced plants is now one of the important phases of primary production. This applies particularly to the higher rainfall districts and this talk deals with that aspect of pasture work.

Only in recent years has much attention been directed towards intense pasture work which has been made possible through the medium of Subterranean Clover. Sponsored by that great benefactor to South Australian Agriculture, the late Mr. A. W. Howard, Subterranean Clover has been responsible for the pioneering of pasture improvement throughout the better rainfall districts of this State, and at present some very satisfactory high producing pastures claim attention. These provide excellent examples of what can and should be accomplished over much of our country not yet so highly developed.

Throughout the area under discussion the natural fertility of soils was, for the most part low, with a general deficiency in both nitrogen and phosphorous content, which presented a difficulty in the economic production of favourable yields from any type of crop over an extended period, unless those necessary elements were supplied.



Bailing Meadow Hay at the Meadows

Fortunately, the introduction of Subterranean Clover and super has created a general improvement of soil fertility which enables the agriculturist to grow a great variety of crops with more certainty. Under these improved conditions, intense pasture work has been made possible and should continue to make progress.

During a recent inspection of many of the best permanent pastures in our hills districts some excellent pastures were seen, but the outstanding ones were few and far between. However, the best of these indicated what could be done, and provided concrete evidence in support of educating the majority of farmers to reach the standard achieved by the few.

Perennial Rye Grass and Clover for Hay.

The Subterranean Clover seed industry has increased enormously and has in a sense had some check on improved pasture development on fields that have produced high yields of seed. Very remunerative returns have been possible by raking for seed, but there is now a tendency to treat the more recently established clover paddocks for this purpose and utilise the older fields, with increased fertility, for the growing of permanent pastures and cultivated crops.

Sunflowers at Echunga.

Pasture development has included many of the elementary aspects and a study of the general and seasonal adaptation' of available plants has been necessary.

The high nitrogen level and generally improved fertility of soils promoted by the pioneering work of Subterranean Clover cause the ingress of numerous volunteer annual grasses which are short-lived and produce a bulk of inferior quality feed. One exception, perhaps, is Soft Brome, which has claimed recognition as a valuable grass in combination with Subterranean Clover on soils not suitable to carry perennial grasses.

Rainfall and its incidence, coupled with soil type and climatic conditions play an important part in determining the pasture plants that may be grown, and it is only under selected conditions that a perennial legume such as White Clover or Strawberry Clover can be established to advantage.

Subterranean Clover, however, thrives on the majority of soils which come under consideration for intense pasture development and although an annual selection has given us early, mid-season and late strains, all of which can be ultilised to advantage according to soil types and rainfall.

The ambitious grassland farmer aims at producing an extended period of useful grazing, and being forced to use an annual legume, relies on the introduction of suitable perennial grasses to play a very important part in the pasture improvement programme.

That perennial grasses can be sown to replace the inferior annuals has been demonstrated repeatedly by establishing Perennial Rye Grass, which is the outstanding pasture grass in use.

The voluntary appearance of this desirable perennial in many of the old clover fields is indeed pleasing and any effort by the farmer to encourage its ingress is sound policy. Other important grasses which will be referred to later in connection with pasture management are *Phalaris tuberosa,* Wimmera Rye and Yorkshire Fog.

That a definite step forward has been made in laying the foundation of improved pastures must be accepted, but correct management is a matter of economic importance still unrecognised by far too many farmers.

A Silage Stack on Kangaroo Island.

Maximum results can be obtained by keeping pastures well grazed, a practice which extends the useful grazing period and reduces waste to a minimum, whereas understocked fields showing a bulky, unpalatable covering of feed present examples of mismanagement and waste.

The subdivision of pastures into small fields and the adoption of rotational grazing permits rapid and even feeding off without overstocking. Under this system of management, other useful perennial grasses in *Phalaris tuberosa* and Yorkshire Fog Grass, which are less palatable than Perennial Rye Grass and need close grazing, can be included in the pasture mixtures to increase productivity.

Both *Phalaris tuberosa* and Yorkshire Fog Grass lose succulency and palatability when allowed to become "stalky" and should not be included in a pasture mixture unless the rotational system of grazing is to be practised.

No system of pasture management can be executed effectively, unless some provision is made to supply adequate feed during the lean period when the growth of pasture plants is more or less dormant, and this brings us to the present weak link in the chain of successful pasture management in this State. Cultivated crops such as oats or rye for early greenfeed, Sudan grass, Japanese millet, maize, chou moellier, mangels, turnips, and lucerne provide a variety of crops that can be grown to advantage in selected portions of the farm, but do we make full use of the possibilities they offer? Meadow hay, cereal hay and ensilage as conserved fodders have been accepted more readily than cultivated crops as a means of increasing the carrying capacity of farms, but even this phase of the work has been somewhat neglected, and it will be the subject of a talk at a later date.

In this talk it is attempted to impress upon grassland farmers the possibilities of pasture development, the importance of establishing the most suitable type of pasture and the need for improved methods in pasture management.

With advancement in pasture work which allows heavier stocking, it is necessary to make a close study of animal husbandry under the changed conditions, and there is a tendency to discount this side of the work so closely associated with pasture improvement in the high rainfall districts.

The Department of Agriculture is ever ready to give advice on pasture improvement and invites collaboration with farmers on this and other phases of the work so closely allied to it.

Trees on the Farm

An address broadcast through 5CK by Edgar W. Pritchard (Agricultural Botanist).

In the early days of colonisation in Australia, the average settler regarded trees as one of the chief impediments to bringing his land into profitable production, something to be got out of the way as soon as possible to make room for grass for farm animals and crops for human food.

This process, though apparently wasteful, was nevertheless inevitable in the circumstances, because there was at that time no market for the timber; but most people will agree that the process was carried much too far. To-day one can travel through mile upon mile of country where there is hardly a tree to be seen, where there is nothing to break the force of the wind and nothing to shelter farm animals but fencing posts and telegraph poles.

Yet trees are an essential part of the farm economy. They are a shelter for farm stock during hot days. Under natural conditions most animals, in hot weather, feed in the morning and evening and rest during mid-day hours. This mid-day siesta is essential for their health, but it cannot do them much good when they have to stay in the broiling sun.

There is no better means of providing shelter from cold winds which sweep across our sea-coast plains than a belt of trees along the windward side of each paddock.

Next comes the live question of wind erosion. Every year, hot north winds take their toll of the fallows in the wheat-growing areas, lifting the fine particles of soil into the sky and depositing them away out to sea. Nearly all of this can be obviated by belts of trees judiciously placed.

Trees on the Farm in Relation to Crops.

Strong winds of all kinds absorb moisture from the soil, and in this way the crop is sure to suffer in those localities where the rainfall is not more than sufficient for one crop a year. In certain experiments in America, it has been found that a belt of shelter trees reduced the evaporation as much as 65 per cent., and increased the yield of wheat by 10bush. per acre. This was close to the break wind, the gain diminishing with the distance from it. But the gain was much more than sufficient to pay the rent of the land occupied by the trees. Also proper tree protection is very useful at the critical harvest period when a strong wind at the wrong time may shake the grain out of the heads, or lay the crop down where it cannot be successfully reaped.

Again, there is that use for trees which is becoming more urgent every day, namely the provision of wood for posts, the building of sheds and outhouses, and for firewood for the household.

But there is a still more important aspect of the timber problem which has only lately come into prominence, that is the question of mechanical power on the farm. The supply of mineral oil is a strictly limited quantity, and at the present rate of consumption will soon be exhausted. But long after the supplies of oil and coal are dissipated, the inexhaustible fertility of the earth will be producing fuel as well as food, clothing, and shelter for the human race.

The need of timber for building, for paper, for artificial silk, &c., has been well emphasised but it seems probable that its use as fuel will eventually far out-strip them all.

Producer-gas plants for stationary engines, and for lorries and tractors are already in use on a few farms in South Australia. With a supply of wood close at hand, the South Australian farmer will thus be able to compete on much more equal terms with countries where oil is cheap or where electrical power from water is available. But all this depends on a regular supply of fuel right on the spot.

The ideal breakwind is composed of one row of tall trees in the middle, a row of medium-sized ones on each side and a row of small shrubby trees on the outsides. If all these are planted alternately, they will make an impenetrable wall of foliage which will break the strongest winds. Also the slope of the tops will tend to divert the wind upwards and thus afford protection to a larger area; at the same time it will prevent damage to the breakwind itself.

Where this arrangement is not practicable three rows of different heights can be planted with the slope of the tops against the direction of the prevailing winds, or two rows arranged in the same way; or as a minimum, one row composed of tall trees well spaced with small bushy ones to fill the gaps between their trunks. The last should be used only where land is valuable and space is the most important consideration.

Suitable Trees.

The best varieties to plant depends on soil and climate. For the Hills Districts and the South-East, there is a considerable variety to choose from—Gums, Poplars, Elms, Oaks, and the Plane tree can all be used, with Cypresses for the outside rows or for interplanting. For the single row breakwind, the Remarkable Pine is perhaps the best because it spreads out at the bottom and so does not need any filling.

On the plains and in the Mallee, the choice is much more restricted, for there are only a few trees which can thrive under the intense summer heat and drought of these localities. Where the soil is fairly good and deep, and the rainfall over 20 inches, Sugar Gum or Canary Island Pine, with Monterey Cypress for filling are perhaps the best. While for lower rainfall districts, Sugar Gum interplanted with Olive or Kaffir Apple should prove effective.

For limestone country there is nothing so good as Tuart Gum. Even in travertine land, if the limestone crust is taken out from a hole about 2ft. deep in diameter, Tuart Gums will do quite well. Also Kaffir Apple or Olive answer for interplanting if treated in the same way.

Most of the trees mentioned can be obtained from the Forestry Department. Also most of them can be raised from seed if planted in autumn in a nursery bed, well covered with sand and watered occasionally through summer. After planting out, the young trees should be watered four or five times through the first summer and the land between kept cultivated for three or four seasons.

A Poison Bait for Slugs and Snails.

During the past year reports of the successful use of a new type of poison for destroying slugs and snails have appeared in several English horticultural and agricultural journals. This substance is metaldehyde, which, however, cannot be bought as such in Australia. Fortunately, "Meta," a commercial product, consists almost entirely of metaldehyde, and baits may be made of this material, which is easily obtainable.

The bait has been found to be attractive and poisonous to both slugs and snails, and apparently does not lose its potency after rain or watering. The poisoned slugs and snails do not move far from the baits, so that large numbers of the pests are found lying in moribund condition. The poison acts slowly, and it appears that death is frequently caused by exposure to the heat of the sun and to dryness, rather than directly by metaldehyde poisoning. The baits are prepared by powdering two large tablets (8 gm.) of "Meta" and mixing them thoroughly with 1 quart of bran. The bait may be used dry, but is probably more attractive when moistened by adding about half a cup of water to 1 quart of bran. This is less dangerous than the arsenic baits frequently recommended, but metaldehyde is poisonous to man, if eaten, and particular care should be taken in preparation of bait. It is recommended that the bait be broadcast, or placed in small heaps about 2ft. apart where the pests are plentiful or around seedlings, which are attractive to them. (*C.S. and I.R. Journal*, November, 1937.)

Parafield Egg-Laying Competition, 1937-38

Review of the Competition for the Month of March, 1938

[By C. F. ANDERSON (Chief Poultry Adviser and A. CLIFTON (Competition Attendant).]

The scores for the final month of the Competition showed the usual reduction, and several more birds went into a full moult. The production for the month, however, was satisfactory, particularly of the leading birds. Several hot days were experienced during the latter half of March, but this did not appear to affect the leading birds in their respective classes. The 31st of March was the termination of the Competition. In practically all sections the scores were a little lower than for the previous year, but in the 1936-7 Competition the scores were particularly good. Scores were a little better in the Home Project Section, and it is interesting to note that the best two birds in the whole Competition competed in this section. The winning bird, a White Leghorn entered by Master Rex Johnson, laid 258 first grade eggs, and the second, a Rhode Island Red entered by Master Keith Johnson, laid 254 first grade eggs. The Black Orpington entered in this section by Master B. Ruediger, although she only finished fifth in her section, was 10 eggs ahead of the winner in the open Orpington section.

Among the White Leghorns, the outstanding score was that registered by Mr. H. J. Mills' entry, which laid 253 first grade eggs. Mr. Mills also took first place in trios and teams. The team score of 1,250 was a little lower than that of last year, but as one of the birds in this team laid only 70 eggs, it can be seen that the score registered was for practically only 5 birds, which must be considered very satisfactory.

This Competition was the first one in which the Soaked Grain section had been included, and it is at this juncture that a few interesting remarks may be made. On the average, it appears that the scores were not up to those of the wet mash section, but to make comparisons on the result of one year is hardly fair. Six birds moulted in this section within the first three weeks out of the total of 42 entered. This is rather a high percentage. Another feature is that generally the birds were not in as good a condition at the termination of the Competition as those in the wet mash section. Quite a number of birds in this section went into a full moult during the last month. The winning bird in this section laid 242 first grade eggs.

It is a little bit difficult to account for the scores generally being lower, as climatic conditions have been almost ideal, from an egg-producing point of view for the full 12 months. However, right from the commencement of the Competition it did not appear that exceptionally good scores would be recorded.

One pleasing feature is the high percentage of first grade eggs throughout the whole of the Competition, particularly from October to March, the period during which it is usual for many underweight eggs to be recorded, and it is interesting to note that an extra feed of green-feed was given during the day from that period onward.

Feeding Tests at Parafield Poultry Station.

A new series of feeding tests was commenced at Parafield Poultry Station on the 1st April, 1937. Five tests have been arranged each of 50 White Leghorn pullets. The principal object of these tests is to collect some accurate data concerning the results obtained from the soaked grain method of feeding in different ways, also the production of the birds under the various methods of feeding. The following is a list of the tests that have been arranged:—

A. Morning—Soaked wheat at rate of 8lbs. grain per 100 birds, meat meal ½lb. per 100 birds, greenfeed same quantity as dry grain. Afternoon—Same as morning, but meat meal ¼lb. per 100 birds.

B. Morning—Soaked wheat at rate of 8lbs. per 100 birds, ¼lb. meat meal per 100 birds, ¼lb. linseed meal per 100 birds,

greenfeed same as No. 1 test. Afternoon—Same as morning, but without the ¼lb. linseed meal.

C. Morning—Soaked wheat once a day at rate of 8lbs. per 100 birds, meat meal ¾lb. per 100 birds. Afternoon—Dry wheat at rate of 1¼ozs. per bird.

D. Morning—Soaked barley twice a day at rate of 8lbs. per 100 birds, greenfeed same quantity as dry grain, meat meal ¼lb. per 100 birds. Afternoon—Greenfeed same quantity as dry grain, meat meal ¼lb. per 100 birds.

E. Morning—Soaked wheat and barley at rate of 4lbs. wheat and 4lbs. barley per 100 birds, greenfeed same bulk as dry grain, meat meal ½lb. per 100 birds, linseed meal ¼lb. per 100 birds. Afternoon—Dry grain at rate of ¾oz. wheat per bird and ¾oz. barley per bird.

The quantity of food as stated in the test will vary from time to time according to the requirements of the birds. The quantities stated in the tests are given as a basis, but are also liable to alteration according to the requirements of the stock.

Test.	No. Eggs Laid from 1st April, 1937, to 28th Feb., 1938.	No. Eggs Laid March, 1938.	Total Eggs Laid from 1st April, 1937, to 31st Mar., 1938.
A	6,678	398	7,076
B	6,857	424	7,281
C	6,565	485	7,050
D	6,207	311	6,518
E	6,414	415	6,829

	Value of Eggs.						Cost of Food.						Return Above Cost of Food.			Total Return Above Cost of Food.		
	1st April to 28th Feb., 1938.			March, 1938.			1st April to 28th Feb., 1938.			March, 1938.			March, 1938.			1st April to 31st March, 1938.		
	£	*s.*	*d.*	£	*s.*	*d.*	£	*s.*	*d.*	£	*s.*	*d.*	£	*s.*	*d.*	£	*s.*	*d.*
A	31	10	3	2	3	0	11	14	7	0	18	5	1	4	7	21	0	3
B	31	19	8	2	5	8	11	11	8	0	18	5	1	7	3	21	15	3
C	30	16	7	2	12	3	11	13	7	0	18	6	1	13	9	20	16	9
D	28	7	0	1	13	5	12	13	8	1	3	0	0	10	5	16	3	9
E	29	12	4	2	4	8	12	2	6	1	1	4	1	3	4	18	13	2

Tubercle Free Herd Scheme.

The following herds have been tested and comply with the conditions laid down by the Tubercle-Free Scheme, whereby stud-owners may apply to have their herds tested, free of charge, by the Stock and Brands Department:—

Owner and Address.	Cattle. No. of	Date. Expiry
1. J. H. Dawkins, Para Wirra Jersey Stud	25	16/4/38
2. W. Hawker, Anama Friesian Stud, Central Bungaree, *via* Brinkworth	37	25/11/39
3. O. H. Woodward, Marama Jersey Stud, Gilles Plains	22	2/11/38
4. G. L. Hampton, Cloverdale Illawarra Shorthorn Stud, Echunga	25	12/8/39
5. J. M. Bray, Sweethaven Jersey Stud, Langhorne's Creek	26	19/8/39
6. Kybybolite Experimental Farm, Kybybolite	88	1/9/39
7. A. Kelly, Alexandra Jersey Stud, Milang	38	21/10/39
8. Agricultural College, Roseworthy	70	9/11/39
9. E. F. Schulz, Eden Valley	30	16/12/39
10. M. A. Clark, Echunga	6	19/11/39
11. A. R. Withers, Nalpa Station, *via* Strathalbyn	251	6/4/40
12. J. H. Dawkins, Para Wirra Jersey Stud, Gawler River	24	7/4/40

Agricultural Bureau of South Australia

South-Eastern Conference at Mundalla

A Conference of South-Eastern Branches was held at Mundalla on 23rd March, when Mr. W. H. Warland presided and Mr. S. Shepherd (representing the Advisory Board of Agriculture) gave the opening address. The local arrangements for the Conference were made by Mr. A. Ross Secretary of the Mundalla Branch, whose members displayed an excellent exhibit of produce. A comprehensive set of veterinary instruments and specimens were also exhibited by Mr. Ross, who has charge of the Veterinary Chest belonging to the Branch.

Mr. S. J. Bonney of Glencoe read a paper on "Millet as a Summer Fodder", and a large number of questions were answered by Messrs. W. J. Spafford (Director of Agriculture), R. C. Scott (Chief Agricultural Adviser), H. B. Barlow (Chief Dairy Instructor), W. S. Smith (Veterinary Officer of the Stock & Brands Department), and C. A. Goddard (Assistant Instructor in Wool Classing, School of Mines).

Mr. Shepherd presented the following members of the Mundalla Branch with Life Membership Certificates of the Agricultural Bureau:—Messrs. W. H. Warland, F. R. Dinning, Geo. Evans, and E. Knowling.

In the evening Mr. Spafford addressed the Conference on "A Tour of the Southern Hemisphere."

It was decided to hold the next Conference at Bordertown under the direction of the Tatiara Branch.

Bureau Conference at Cambrai

The first Conference of Branches of the Agricultural Bureau situated in the Murray Plains districts was held at Cambrai on 6th April, when Mr. J. Miller presided over a good attendance of delegates from Springton, Mount Pleasant, Frayville, Summerfield, Brownlow, Millendilla, and Cambrai. Mr. A. J. A. Koch opened the Conference on behalf of the Advisory Board of Agriculture.

An excellent agenda included a large number of veterinary and agricultural questions and also the following papers:—"Youth on the Farm", Mr. H. F. Stevens (Cambrai); "Mechanical Power", Mr. L. Royal (Cambrai); "Destruction of Mallee Scrub", Mr. R. Pietsch (Cambrai); "Pig Raising", Mr. J. Howard Dawkins (Gawler River); and "Feeding Sheep", Mr. E. Owen Brown (Cambrai).

Mr. W. J. Spafford (Director of Agriculture) was accompanied by the following officers:—Messrs. R. C. Scott (Chief Agricultural Adviser), R. H. F. Macindoe, B.V.Sc., M.R.C.V.S., of the Stock and Brands Department; R. L. Griffiths and P. H. Suter (District Advisers), M. W. Aird (Assistant Poultry Adviser), H. C. Pritchard (General Secretary), and F. C. Richards (Assistant Secretary of the Agricultural Bureau).

Mr. G. H. Clarke, B.Sc., Botanist at the Waite Institute, identified a collection of weeds that had been staged by the local Bureau, and in the evening Mr. Spafford gave an illustrated lantern address on "Some Races of the South."

Production and Exports.

The production of butter and cheese for February, 1938, was:—Butter, 1,258,014lbs.; cheese, 1,055,704lbs.

Meat exports (figures taken from statistics supplied by the Australian Meat Board)—

	Total Australian Exports, July, 1937-February, 1938.	
	Carcasses.	
Mutton	550,125	(S. Aus., 110)
Lamb	4,015,249	(S. Aus., 325,614)
Pigs (porkers and baconers)	154,966	(S. Aus., 4,000)
	Cwts.	
Chilled beef	302,875	(S. Aus., nil)
Frozen beef and veal	1,397,986	(S. Aus., 3,222)

Rotation of Crops.

[F. E. Borgas (Wirrabara).]

Owing to a considerable increase in the value of land and high taxation costs, those on comparatively small areas find that unless they crop their land with wheat every second year they have difficulty in making both ends meet. We will have to produce more per acre than we have done in the past, and those who crop every second year with wheat are doing this at too great a cost in soil fertility. Admittedly, wheat is more suited to continuous cropping than possibly any other field crop. When wheat follows wheat certain fertilising properties in the soil are being exhausted, while others are wasted or used up by weeds, and the land tends to become stale. How is the fertility of the soil to be kept up? One way is by rotation of cropping. The rotation suitable for the wheat farmer is one in which wheat is grown alternately with a fodder crop. This means stock raising. My rotation would be wheat, followed by oats or barley on some of the stubble and peas on remaining stubble, with third year fallow. The area intended for cultivation should be divided into three portions. In any one year, portion would be under wheat, portion under fallow, and the remainder under some crop other than wheat. The advantage of this rotation is that two-thirds of the cultivated land is under crop every year, a gain over the present system of fallowing, which only allows one-half the arable land being cropped each year. Under this rotation four crops are obtained in six years against three or only two under the old system. Two of these crops are fodder crops, but their value should exceed that of a single wheat crop, and the fertility of the land is not so much reduced. The object of rotation of cropping is to enrich the soil, add organic matter to it, and to prevent the ground from becoming wheat sick. If this object is achieved, the type of crop is immaterial. The whole food supply of the soil can be utilised by rotation of crops. This is not possible when wheat alone is grown. Some crops feed more deeply than others, the surface feeders leaving stores of food unused. The amount of valuable organic matter in the soil can be maintained or even increased, and the free nitrogen of the air can be made use of by some types of crops. Not only does rotation of crops help to enrich the soil, but it also helps to prevent erosion, because the land is not under fallow every other year. This is a big thing at the present time; some of the soil is being washed about and becoming full of gutters whenever there is heavy rain.

Important Weeds of South Australia

[By G. H. Clarke, B.Sc., Botanist, Waite Agricultural Research Institute, University of Adelaide.]

Nos. 23 and 24—WILD TURNIPS (*Brassica Tournefortii*, Gouan, *Rapistrum rugosum*, All).

Introductory Remarks.

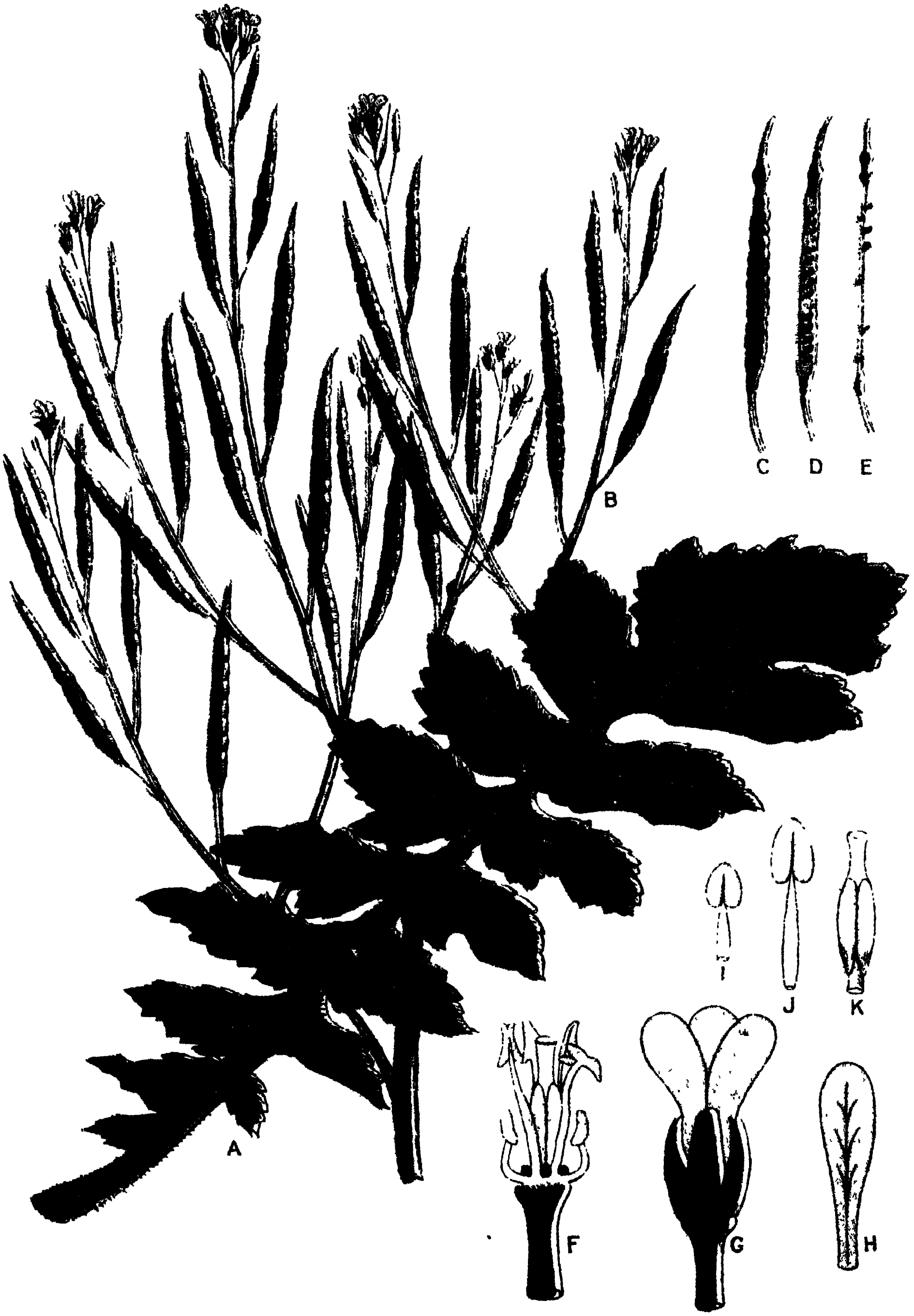
The plant long known to South Australian farmers as "Wild Turnip" is a yellow-flowered Cruciferous weed, often exceedingly troublesome in cereal crops at all stages of its growth, and occurring also on fallowed land, and on roadsides and other uncultivated ground. This plant, known botanically as *Rapistrum rugosum*, is more robust in habit than most other annual *Cruciferae*: in fact, specimens growing under favourable conditions may reach a height of 6-8ft., or even more. It is recognisable in early stages by the shape of its leaves, and in later stages by its extensively branched flowering stems terminated by short heads of flowers which subsequently lengthen to form long spikes or racemes of short, two-jointed seed pods.

Another Cruciferous weed, very similar to the above in its habits of growth but differing markedly in botanical characters, has been known in Western Australia as a weed of cultivation since about 1916, and, during the past 10 or 12 years has spread to an alarming extent throughout the wheat growing areas of that State. The botanical name of this plant, which is called Wild Turnip in Western Australia, is *Brassica Tournefortii*. It is distinguishable from *Rapistrum rugosum* by its elongated seed pods—more nearly resembling those of Charlock (*Brassica Sinapistrum*) and Wild Mustard (*Sisymbrium orientale*)—and by its more regularly pinnatisect leaves.

Until quite recently the Western Australian, or long-fruited, Wild Turnip was believed to be confined to the western-most State. During the past year, however, it has been found at Barton on the East-West Railway, at Pygery on Eyre's Peninsula, and at Galga and several other places in the Murray Mallee. Indeed it is now firmly established in a number of situations in the last-named area.

In South Australia it has not been customary to regard the short-fruited Wild Turnip (*Rapistrum rugosum*) with actual alarm despite the fact that it can be one of the most troublesome weeds with which the wheat farmer has to contend. Whether this is due to its being actually less aggressive than the long-fruited introduction, or to a philosophical attitude on the part of the South Australian farmer which makes him regard weed pests—and serious ones at that—as part of the normal order of things, it is difficult to say. But it should be realised that the long-fruited Wild Turnip (*Brassica Tournefortii*) has come to South Australia, bringing with it the reputation of being the most serious weed pest confronting Western Australian wheat farmers. It constitutes, in fact, the major weed problem of the western State, just as the Cape Tulip—though a very different type of weed—does in the case of South Australia. It is most important, therefore, that farmers should be on the lookout for it and able to recognise it wherever it occurs. For this reason it has been thought desirable to describe the two Wild Turnips together in a single article, in order to emphasise the structural differences whereby the two may be readily distinguished in the field.

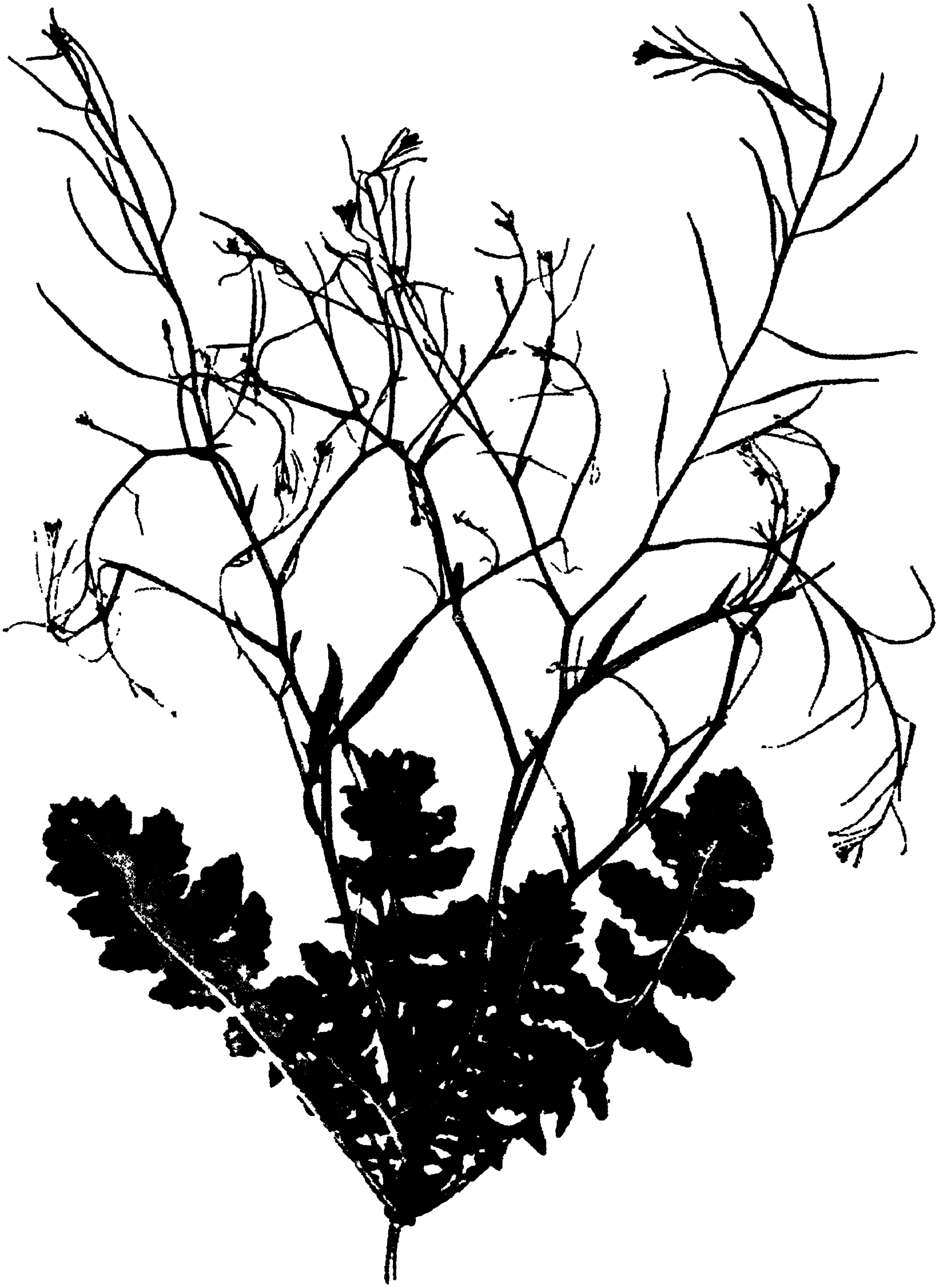
Supplement to the *Journal of Agriculture*, South Australia.



LONG FRUITED WILD TURNIP (*Brassica tournefortii, Gouan.*)

A.—Leaf (about ½ natural size.) B.—Upper part of inflorescence C.—Pod viewed from side.
D.—Pod with one valve removed showing seeds in position. E.—Pod with valves removed showing central partition with some seeds *in situ*, and the persistent terminal beak.
F.—Flower with sepals and petals removed. G.—Single flower. H.—Petal.
I.—Short stamen. J.—Long stamen. K.—Pistil. (C.D.E. after Gardner.)

C. WALL, GOVERNMENT PHOTOLITHOGRAPHER, ADELAIDE.
H. CLARKE, Direxit



Brassica Tournefortii. Single plant, showing the general habit. See coloured plate opposite.

THE LONG-FRUITED WILD TURNIP.

Brassica Tournefortii, Gouan.

A very full description of this weed has been given by Mr. C. A. Gardner, Government Botanist of Western Australia, in the *Journal of Agriculture*, Western Australia, of September, 1933. Since our own experience of the plant is quite recent the following account is based very largely upon that given by Mr. Gardner.

History in Western Australia.

According to Mr. Gardner *Brassica Tournefortii* was probably introduced into Western Australia with imported seed or produce following the drought year of 1914, the most likely countries of origin being Palestine, Egypt, or Tripoli, in all of which it is common. Apparently it was at first confused with Charlock (*Brassica Sinapistrum*) or Wild Radish (*Raphanus Raphanistrum*), and it was not until December, 1928, that the plant was recognised as being a new weed. By this time it had begun to show evidence of its aggressive nature. In December, 1929, *Brassica Tournefortii* was gazetted a noxious weed for the State of Western Australia, but, unfortunately, this was too late to prevent the distribution of chaff from affected areas to other districts towards the end of 1929 and early in 1930, with the result that the weed was distributed far and wide throughout the wheat-growing areas of the western State.

Mr. Gardner gives the range of the weed in 1933 as extending "from Carnamah and Coorow in the north to Lake Varley and Lake King in the south; from Koorda and Kellerberrin in the west to the eastern rabbit-proof fence; a separate centre affected by the weed extending from Widgiemooltha and Norseman through the Mallee district as far south as Scaddan". Apparently the main agency of spread has been the distribution of produce, especially hay and chaff, from affected areas to clean districts.

History in South Australia.

The first record of the occurrence of *Brassica Tournefortii* in South Australia was a specimen collected by Professor J. B. Cleland at Barton, on the East-West Railway, and forwarded to Mr. J. M. Black during September, 1936. Early in April, 1937, the present writer received for identification, through Messrs. L. J. Cook and F. C. Gross, of the Department of Agriculture, an unmistakable specimen of the same plant from Mr. H. E. Thredgold, of Narridy, in the Middle North. Subsequent inquiries elicited the fact that this specimen came, not from Narridy—as had been supposed—but from Galga, in the Murray Mallee, and was collected during a visit to Mr. F. C. Thredgold of that district. Accordingly, information was sought from Mr. R. L. Griffiths, Agricultural Adviser for the Murray Mallee District, as to the extent of its distribution there, and, in reply to a letter, Mr. Griffiths wrote, on the 28th April, as follows:—

> "A plant which is commonly called Wild Turnip, but which I cannot guarantee, of course, as being the one you mention, has been spreading very rapidly in my district during the last two or three years. This plant is certainly very aggressive, and—I should think it was a *Brassica*. It grows very strongly with heavier and tougher stems than the Wild Mustard, and is often very troublesome to farmers when harvesting. It appears that it might take full possession. Some farmers say that sheep will eat it, but the majority claim that it is not palatable to any class of stock. The area chiefly infested at present is from Karoonda to Alawoona, the worst part being from Borrika and Mindarie, spreading rapidly on both sides of the railway line. I have been rather afraid of this weed for some time but do not know just how it can be checked."

In a subsequent letter dated 22nd June, 1937, written to the Director during the writer's absence, Mr. Griffiths wrote:—

> "Mr. Clarke thought that most of the plants would be *Rapistrum rugosum*". "I am now, unfortunately, in a position to say that most if not all of the plants are *Brassica Tournefortii* and that this weed is much more widespread than was anticipated. I enclose seed heads of a specimen taken from a group of many plants growing near Sandalwood recently."

Other localities mentioned by Mr. Griffiths were Yurgo and Nunkeri, from the first of which numerous specimens in all stages of growth were collected during a visit by Dr. I. Phipps, of the Waite Institute, during August, 1937. Thus, it is evident that the weed already enjoys an extensive distribution in the Murray Mallee District. It may be mentioned in passing that the material from which the accompanying coloured plate was prepared, was very kindly sent to us by Mr. F. C. Thredgold, of Galga, and arrived in excellent condition.

A third centre of infestation has been brought to our notice, quite recently, by the receipt of a specimen, through the General Secretary of the Agricultural Bureau, from Mr. W. Duggin, of Pygery, Eyre's Peninsula, early in February of this year. Thus it looks as though seeds of the weed have been distributed to a number of centres in South Australia; and that an extensive invasion of the wheat areas will take place if the plants are not recognised early, and destroyed, in the situations where they appear.

Botanical Name and Classification.

Brassica, the latin name for the cabbage, has been applied as a botanical name to a genus of Cruciferous plants comprising more than 50 species, many of which are of importance as vegetables, *e.g.*, cabbage, cauliflower, brussels sprouts (*B. oleracea,* and its varieties), turnip (*B. napus*), rape (*B. rapa*), or as condiments, *e.g.*, white mustard (*B. alba*), black mustard (*B. nigra*), while others are troublesome weeds, *e.g.*, Charlock (*B. Sinapistrum*), Buchan Weed (*B. adpressa*), and Wild Turnip (*B. Tournefortii*). The specific name is in honour of the botanist J. P. de Tournefort, 1656-1708.

The genera of Cruciferous plants are not well defined, but the main characters serving to distinguish species of *Brassica* from other *Cruciferae* are the folded (conduplicate) seed leaves of the embryo within the seed, and the elongated, more or less cylindrical seed pods containing a single row of seeds in each cell, and terminated by a conical beak. The absence of this beak serves to distinguish the Wild Mustard (*Sisymbrium orientale*) from species of *Brassica.*

Two *Brassicas* which have long been established weeds in this State are *B. Sinapistrum* and *B. adpressa,* known respectively as Charlock and Buchan weed. From the first *B. Tournefortii* is readily distinguished by its 1-nerved, as against 3-5-nerved, seed pods, and by its fewer and narrower stem leaves; from the second it differs by having the seed pods diverging from the axis, not pressed against it.

Description of Brassica Tournefortii.

The following abbreviated account is based upon the very full descriptions given of this plant by O. von Schulz, in a recent monograph, and C. A. Gardner in the article above referred to:—

An erect annual clothed with stiff spreading hairs, ½—6ft. high, with a long vertical taproot. Stems branching from the base, rarely simple, flexuose, terete, bristly hairy below, becoming glabrous above, green or violet-coloured. Basal leaves rosulate, spreading to a diameter of 1½-2ft., shortly and widely petiolate, lyrate-pinnatifid with 4-12 pairs of segments, the terminal segment almost obovate-orbicular in outline, more or less 3-lobed, obtuse and obliquely cordate at the base, the margins crenate-toothed; lateral lobes decreasing in size from above to below, becoming oblong and entire, all auriculate at the base, stem leaves much smaller, setaceous-hispid on both sides and especially on the midnerve, oblong or linear, acute, entire or denticulate. Racemes 10-25-flowered. elongating in fruit. Flowers small; petals pale yellow, often violet in the claw; ovary cylindrical with 10-22 ovules in each cell. Fruiting pedicels about ½in. long; pods erect-spreading or almost divaricate, 1½-2½in. long, terminating in a conical beak ¼-⅓ as long and containing 1 or 2 seeds, the valves 1-nerved, notched at the apex, greenish-yellow or violet-tinted. Seeds small globular, pale purple-brown with black hilum, alveolate, pendulous but erect in the beak. Period of flowering,—July to November.

Characters as a Weed.

The long-fruited Wild Turnip is a very serious competitor of crops and pasture plants at all periods of its growth. During the rosette stages it is apt to smother young herbage species, and, when present in quantity, will almost monopolise the surface of large patches of ground. At this stage it somewhat resembles Capeweed (*Cryptostemma calendulaceum*) both in habit of growth and in the shape of its leaves, but is readily distinguishable from the latter by its bristly-hairy leaves which are green on both sides, not whitish underneath; by the subsequent growth of an erect stem, and by its pronounced turnip-like odour when bruised.

The plants are stated by farmers to flower at almost any time of the year, and the seeds to germinate wherever and whenever the necessary conditions as regards moisture, etc., are obtainable. Thus the flowering and seeding period in a given locality is prolonged, and the seeds, moreover, produced in large numbers, are believed to remain viable in the soil for several years. On the other hand the growing period in the case of individual plants is short, the stage of maturity being quickly reached,—within a month, in fact, from the time of germination.

The opinion expressed by the majority of farmers who have had experience of the weed in the Murray Mallee, namely, that it is not palatable to any class of stock, is in accord with Western Australian experience. Taken in conjunction with the fact that the plant has a long taproot which enables it to thrive in situations much too dry for most annual weeds, its relative immunity from being grazed down by sheep becomes a serious factor contributing towards its aggressiveness as a weed.

A peculiarity of the old plants is their tendency to break away from the taproot at ground level, and to be blown along the ground perhaps for considerable distances, thus facilitating the dispersal of their seeds. While this may take place in open situations, we should hardly expect it to occur in the case of plants surrounded and protected by a cereal crop. This doubtless explains the difficulties experienced by farmers with the weed during harvesting operations. The short-fruited Wild Turnip (*Rapistrum rugosum*) does not break away in this manner and is a notorious offender at harvest time, the thick stems being difficult to cut with a binder, and the flowering stems tending to choke the reaping machines during grain harvesting.

Means by Which it is Spread.

The chief agency of natural spread is the wind, the seeds being small and light and readily dispersed by this means. The breaking away from the taproot, in the case of old plants, has been mentioned, and this undoubtedly favours the spread of the plants.

While the local spread of the weed may be effected in this way, the main method of distribution throughout agricultural lands appears to have been the passive spread of seeds due to the transportation of farm produce, hay, chaff, grain, etc., from infested areas to clean lands. The presence of the weed near the railway sidings in several centres in the Murray Mallee points to the conclusion that the plant has entered this State with farm produce or livestock imported from Western Australia.

(*To be Continued.*)

Rainfall Table

The following figures, from data supplied by the Commonwealth Meteorological Department, show the rainfall of the subjoined stations for the month and to the end of March, 1938; also the average precipitation for March, and the average annual rainfall.

Station.	For March, 1938.	Av'ge. for March.	To end March 1938.	Av'ge. Annual Rainfall.
FAR NORTH AND UPPER NORTH.				
Oodnadatta	—	0·45	3·52	4·60
Marree	—	0·51	2·95	5·78
Farina	—	0·65	3·23	6·30
Copley	—	0·68	2·54	7·72
Beltana	—	0·69	1·58	8·34
Blinman	—	0·76	2·38	11·64
Hookina	—	0·65	2·30	10·85
Hawker	—	0·60	2·11	12·04
Wilson	—	0·58	2·65	11·63
Gordon	—	0·71	2·64	10·25
Quorn	—	0·59	5·36	13·02
Port Augusta	—	0·71	3·15	9·38
Bruce	—	0·67	2·40	9·78
Hammond	—	0·66	2·27	11·02
Wilmington	—	0·78	3·80	17·17
Willowie	—	0·73	1·59	12·07
Melrose	0·5	1·07	5·50	22·79
Booleroo Centre	—	0·66	2·65	15·08
Port Germein	0·1	0·75	2·31	12·49
Wirrabara	—	0·94	3·54	19·13
Appila	0·1	0·86	3·44	14·55
Cradock	—	0·57	3·28	10·62
Carrieton	—	0·57	4·23	12·06
Johnburg	—	0·55	2·69	10·47
Eurelia	—	0·60	3·99	12·61
Orroroo	—	0·64	4·80	13·10
Naokara	—	0·83	1·79	11·09
Black Rock	—	0·69	2·49	12·24
Oodlawirra	—	0·72	2·92	11·37
Peterborough	—	0·72	2·60	13·11
Yongala	—	0·67	2·88	14·37
NORTH-EAST.				
Yunta	—	0·57	1·74	8·44
Waukaringa	—	0·58	2·25	7·85
Mannahill	—	0·52	0·98	8·06
Cockburn	—	0·48	0·32	7·85
Broken Hill	—	0·61	0·35	9·37
LOWER NORTH.				
Port Pirie	0·3	0·82	2·47	13·16
Port Broughton	0·3	0·64	3·24	13·82
Bute	0·21	0·67	2·35	15·36
Laura	0·2	0·85	2·80	17·88
Caltowie	0·1	0·83	3·46	16·65
Jamestown	—	0·85	4·17	17·63
Gladstone	0·6	0·73	3·37	16·24
Crystal Brook	0·6	0·71	5·53	15·72
Georgetown	0·6	0·81	4·32	18·17
Narridy	0·4	0·79	3·29	15·66
Red Hill	0·7	0·72	2·95	16·54
Spalding	0·8	0·79	3·51	18·51
Gulnare	0·6	0·73	3·60	18·37
Yacka	0·6	0·64	2·11	15·34
Koolunga	0·5	0·65	1·57	15·21
Snowtown	0·13	0·72	2·42	15·67
LOWER NORTH—*continued.*				
Brinkworth	0·3	0·75	1·60	15·60
Blyth	—	0·73	2·13	16·68
Clare	0·5	1·03	4·30	24·42
Mintaro	0·1	0·92	4·64	23·27
Watervale	—	1·12	4·41	26·66
Auburn	—	1·10	4·05	23·89
Hoyleton	0·8	0·79	3·09	17·27
Balaklava	0·12	0·72	1·76	15·34
Port Wakefield	0·9	0·90	1·43	12·90
Terowie	0·2	0·62	3·11	13·29
Whyte-Yarcowie	0·5	0·78	2·55	13·55
Hallett	0·4	0·69	4·00	16·37
Mount Bryan	0·9	0·72	3·83	16·74
Kooringa	—	0·87	3·76	17·75
Farrell's Flat	—	0·74	4·96	18·51
WEST OF MURRAY RANGE.				
Manoora	—	0·83	3·83	18·87
Saddleworth	—	0·96	4·00	19·58
Marrabel	—	0·87	3·97	19·90
Riverton	0·7	1·02	3·13	20·80
Tarlee	0·11	0·80	2·84	18·06
Stockport	0·10	0·80	2·81	17·04
Hamley Bridge	0·8	0·78	1·90	16·50
Kapunda	0·9	0·99	3·99	19·71
Freeling	0·6	0·88	2·70	17·73
Greenock	0·9	0·96	4·30	21·42
Truro	0·1	0·94	2·76	19·72
Stockwell	0·3	0·88	3·12	19·98
Nuriootpa	0·12	0·94	4·36	20·77
Angaston	0·10	0·98	4·44	22·29
Tanunda	0·5	1·03	3·05	21·94
Lyndoch	0·13	0·85	3·12	23·17
Williamstown	0·15	0·97	4·21	27·41
ADELAIDE PLAINS				
Owen	0·11	0·62	2·36	14·83
Mallala	0·12	0·76	1·89	16·39
Roseworthy	0·14	0·82	3·31	17·37
Gawler	0·16	0·90	2·52	18·81
Two Wells	0·11	0·77	1·59	15·75
Virginia	0·8	0·86	2·10	17·17
Smithfield	0·8	0·89	2·57	17·62
Salisbury	—	0·95	2·81	18·49
Adelaide	0·13	1·02	3·19	21·17
Glen Osmond	0·8	1·03	2·92	25·84
Magill	0·9	1·15	3·46	25·24
MOUNT LOFTY RANGES				
Teatree Gully	0·6	1·23	4·06	26·83
Stirling West	0·27	1·82	6·13	46·86
Uraidla	0·9	1·80	5·29	43·64
Clarendon	0·29	1·50	4·05	32·74
Happy Valley Res.	0·24	—	3·22	—
Morphett Vale	0·29	1·12	3·20	22·56
Noarlunga	0·48	1·03	3·95	20·35
Willunga	0·35	1·22	2·47	25·91
Aldinga	0·30	1·05	2·32	20·11

RAINFALL—*continued.*

Station.	For March, 1938.	Av'ge. for March.	To end March 1938.	Av'ge. Annual Rainfall.
MOUNT LOFTY RANGES—*continued.*				
Myponga	0·29	0·98	3·23	29·45
Inman Valley	0·39	—	2·83	—
Yankalilla	0·27	1·16	2·08	22·70
Mount Compass	0·46	1·94	3·26	36·32
Mount Pleasant	0·22	1·08	2·82	27·02
Birdwood	0·15	1·06	2·51	28·86
Gumeracha	0·9	1·26	3·31	33·12
Millbrook Reservoir	0·7	1·01	4·30	34·00
Lobethal	0·12	1·25	3·47	35·79
Woodside	0·14	1·16	3·23	32·01
Hahndorf	0·13	1·34	3·36	34·65
Nairne	0·17	1·26	2·70	28·04
Mount Barker	0·16	1·34	3·15	31·17
Echunga	0·25	1·43	3·93	33·25
Macclesfield	0·30	1·38	2·74	30·29
Meadows	0·35	1·64	3·97	35·93
Strathalbyn	0·30	1·02	2·27	19·35
MURRAY FLATS AND VALLEY.				
Meningie	0·41	0·90	3·04	18·28
Milang	0·35	0·80	2·27	14·85
Langhorne's Creek	0·23	0·91	2·19	14·99
Wellington	0·8	0·88	1·61	14·68
Tailem Bend	0·36	0·99	2·33	15·19
Murray Bridge	0·31	0·88	1·51	13·51
Callington	0·5	0·81	1·10	15·14
Mannum	0·14	0·82	1·68	11·51
Palmer	0·18	0·83	1·78	15·70
Sedan	0·5	0·68	1·72	11·99
Swan Reach	0·5	0·73	2·06	10·60
Blanchetown	0·5	0·78	2·00	10·97
Eudunda	0·16	0·81	4·24	17·16
Point Pass	—	0·64	3·30	16·93
Sutherlands	—	0·66	1·82	10·73
Morgan	—	0·54	1·54	9·12
Waikerie	—	0·54	1·31	9·71
Overland Corner	—	0·79	1·87	10·21
Loxton	—	0·79	1·91	11·34
Berri	0·3	0·42	2·19	10·11
Renmark	0·1	0·66	1·38	10·37
WEST OF SPENCER'S GULF.				
Eucla	0·17	0·90	1·00	10·06
Nullarbor	—	0·76	0·51	8·79
Fowler's Bay	0·3	0·54	1·56	11·89
Penong	0·7	0·56	2·87	12·22
Koonibba	0·20	0·62	5·74	12·16
Denial Bay	0·19	0·60	4·59	11·31
Ceduna	0·10	0·54	5·01	10·30
Smoky Bay	0·9	0·43	4·61	10·42
Wirrulla	0·9	0·56	7·48	10·71
Streaky Bay	0·4	0·57	5·54	14·85
Chandada	0·14	0·64	6·70	12·31
Minnipa	0·22	0·58	7·10	13·83
Kyancutta	0·24	0·73	4·61	13·16
Talia	0·10	0·54	5·46	14·50
Port Elliston	0·4	0·55	5·23	16·44
Lock	0·40	0·56	5·73	16·23
Mount Hope	—	—	3·81	—
Yeelanna	0·2	0·60	4·28	15·92
Cummins	—	0·50	4·55	17·47
Port Lincoln	0·3	0·82	4·11	19·27
Tumby	0·6	0·73	4·15	14·16
Ungarra	0·9	0·76	3·30	16·81
Port Neill	0·72	0·61	4·16	13·06
WEST OF SPENCER'S GULF—*continued.*				
Arno Bay	0·31	0·73	3·02	12·72
Rudall	0·25	0·58	3·88	12·94
Cleve	0·10	0·79	4·10	14·90
Cowell	0·5	0·79	2·04	11·06
Miltalie	0·10	0·97	4·10	13·72
Mangalo	—	0·74	3·39	13·80
Darke's Peak	0·9	0·53	3·53	15·08
Kimba	0·2	0·53	3·40	11·64
YORKE PENINSULA.				
Wallaroo	0·2	0·82	3·64	13·93
Kadina	0·3	0·88	3·64	15·53
Moonta	0·5	0·84	3·56	14·98
Paskeville	—	0·74	2·51	15·47
Maitland	0·14	0·86	4·15	19·76
Ardrossan	0·3	0·73	1·74	13·91
Port Victoria	0·39	0·66	2·97	15·33
Curramulka	0·30	0·86	1·80	17·72
Minlaton	0·35	0·82	2·25	17·65
Port Vincent	0·35	0·63	1·64	14·26
Brentwood	0·38	0·72	2·30	15·52
Stansbury	0·34	0·77	1·96	16·75
Warooka	0·16	0·67	3·01	17·38
Yorketown	0·25	0·74	2·35	16·81
Edithburgh	0·27	0·80	2·60	16·31
SOUTH AND SOUTH-EAST.				
Cape Borda	0·19	0·89	4·91	24·83
Kingscote	0·7	0·80	2·51	19·20
Penneshaw	0·11	0·73	1·80	19·09
Victor Harbour	0·38	1·00	2·73	21·37
Port Elliot	0·36	1·00	2·79	19·93
Goolwa	0·50	0·96	3·35	17·85
Maggea	0·1	0·48	1·95	10·32
Copeville	0·5	0·69	2·66	11·64
Claypans	—	0·52	1·69	10·77
Meribah	—	0·55	1·42	11·26
Alawoona	—	0·39	1·50	10·43
Caliph	—	0·58	1·46	10·60
Mindarie	—	0·51	1·46	12·16
Sandalwood	0·3	0·64	2·04	13·67
Karoonda	0·7	0·67	1·82	14·33
Pinnaroo	0·1	0·88	1·99	14·14
Parilla	0·2	0·64	2·41	13·67
Lameroo	0·2	0·79	2·71	15·79
Parrakie	—	0·79	1·65	14·58
Geranium	—	0·87	1·91	16·36
Peake	0·9	0·99	1·78	15·87
Cooke's Plains	0·33	0·94	2·54	15·33
Coomandook	0·31	0·94	2·03	17·01
Coonalpyn	0·21	0·90	2·22	17·65
Tintinara	0·24	0·91	2·18	18·68
Keith	0·27	0·79	3·01	17·95
Bordertown	0·58	0·83	3·36	19·16
Wolseley	0·66	0·77	2·95	18·50
Frances	0·59	0·92	4·43	20·18
Naracoorte	0·58	1·02	4·30	22·64
Penola	0·28	1·23	3·30	25·89
Lucindale	0·37	1·01	3·73	23·48
Kingston	0·26	0·99	1·80	24·24
Robe	0·51	1·02	1·53	24·63
Beachport	0·84	1·16	2·73	27·06
Millicent	1·41	1·32	4·14	29·93
Kalangadoo	0·59	1·20	5·31	32·00
Mount Gambier	1·55	1·42	4·42	30·29

Agricultural Bureau of South Australia

Reports Received from Branches

The following is a list of the Branch reports received during the month, and shows the date and principal subject of each meeting:—Allandale East, 11th March, annual meeting. Appila, 4th March, harvest reports. Balumbah, 2nd March, "Harvesting Machinery," J. E. Swann. Beetaloo Valley, 15th February, harvest reports. Black Springs, 22nd March, "Superphosphate," O. Bowden. Blewitt Springs, 15th March, "Vegetable Growing," M. Jacobs. Blyth, 25th February, address, C. A. S. Hawker, M.H.R. Booleroo Centre, 25th February, harvest reports. Boor's Plains, 3rd March, address, C. Rodda. Brownlow, 16th March, harvest reports. Bute, 4th February, discussion; 4th March, harvest reports. Chandada, 14th February, **presentation of Crop** Competition trophies. Chapman's Bore, 11th November, "The Axe," C. A. Bullen; 14th February, "Farm Masonry," R. Ackland. Devlin's Pound, 22nd February, harvest reports. Glencoe, 1st March, "Millet as a Summer Fodder," S. J. Bonney. Goode, 9th March, harvest reports. Hartley, 9th February, "Tractor *v.* Horses," H. Stanton; "Pneumatic-tyred Tractors," L. Brook; 16th March, address, W. J. Spafford. Inman Valley, 24th March, address, R. Hill. Jervois, 3rd March, papers from *New Zealand Farmer.*" Karte, 16th February, formal; 16th March, formal. Keyneton, 9th March, "Pasture Improvement," A. G. Lillecrapp. Keith, 21st February, "Fire Control," A. Taylor. Kilkerran, 14th March, "Wheat Prices," E. G. Brown. Koonunga, 9th March, address, J. E. Maycock. Kyancutta, 1st March, "Nauru," G. Strawbridge, Crop Competition reports. Maltee, 10th March, harvest reports. Milang, 12th March, harvest reports. Miltalie, 14th March, "Horses *v.* Tractors," D. P. Bagnell and R. G. Ramsey. Monarto South, 15th March, "Poultry," M. W. Aird. Mount Bryan, 26th February, harvest reports. Mount Pleasant, 2nd March, address, R. C. Scott; discussion, "The Sheep Blowfly." Murraminga, 12th March, report on pasture plots. Myponga, 17th March, "Soil Acidity and Lime," J. J. Muller. Nantawarra, 10th March, paper from *Journal.* Narridy, 5th March, discussion. Nunjikompita, 10th March, discussion. Paskeville, 15th March, "Weighing Wheat," J. Prouse. Penola, 11th March, "Trees and Shrubs," A. D. Adamson. Poochera, 1st March, discussion, Crop Competitions. Port Elliot, 19th February, "Corriedale Sheep," P. J. James. Pygery, 15th March, discussion, "Crutching." Red Hill, 15th March, Branch Re-Union. Rosedale, 16th March, "Soils and Fertilisers," O. Bowden. Sandalwood, 21st March, re-organisation. Shoal Bay, 15th March, discussion. South Kilkerran, 7th March, paper, E. H. R. Dutschke. Summerfield, 11th March, discussion; 21st March, address, C. A. Goddard. Sutherlands, 10th March, "Horses *v.* Tractors," A. M. Twartz. Truro, 21st February, election of officers; 28th March, harvest reports. Wandearah, 15th March, discussion. Warramboo, 24th February, "Recreation," D. McKenzie. Willowie, 1st March, harvest reports. Yadnarie, 15th March, "Dry Sowing," R. M. Spriggs.

Papers Read at Conferences

Millett as a Summer Fodder

[S. J. Bonney, Glencoe (South-Eastern Conference).]

Much has been said and written on the question of summer fodders and of the various types cultivated and preferred by farmers. Rainfall and locality play an important part in the preference and adaptability of types, and even soil textures of districts differ. I have heard it often contended that Millet does not grow to the best advantage on the heavier soils in the centre of the district. Time of sowing and the thorough preparation of the fallow could overcome this. On the dark, heavy soils, sowing should be at least 3 weeks earlier than on the outer edge of the district, which has a clay subsoil 1ft. to 1ft. 6in. below the surface, and holds moisture much longer than the black soils.

The variety of fodders I have tried since occupying my present holding are Sudan Grass, Amber Cane, Chou Moellier, Mangolds, Maize, and Millet. Millet, in my opinion, holds pride of place over all the others. One of the surprises was that super does not influence the growth to any appreciable extent. To prove this, an experiment was conducted at the Glencoe East school. The ground was treated as near to field conditions as was possible; 3 rows of Millet were planted, the first row without super, the second with 20lbs. super, the third with 40lbs. There was no difference in any of the rows, the "no super" row being just as good as the one with 40lbs. of super. I only sow as much super as is necessary to mix with and steady up the run of Millet through the drill, and others who have adopted this have found it to be correct. A patch of early oaten green feed, after it has given quite a lot of early feed and has been well eaten down, can be fallowed at the end of July for Millet, thus obtaining a double use out of the land. Actually, the rotation seems to improve the soil. After the Millet, hay is grown on the same ground.

The first time I tried this rotation of green feed, Millet-oaten hay, super at the rate of 80lbs. per acre was sown with the oat crop. Out of a 12-acre paddock 8 acres grew so prolifically that it went down so badly as to make cutting with any binder impossible. On this rotation no super is sown with the hay crop, and this year a paddock of 13 acres took 12½ balls of twine. Methods of cultural treatment have been tried until one found the method it responded to best. Good fallow is the essential factor if success is to be attained. Fallowing just as deep as will nicely turn the furrow is best. On the heavier soils of the district, fallowing should be done in July; on the clay subsoil land August, and even September, is suitable. After a few weeks lying, and before it begins drying out, the fallow should be well worked down with spring-tooth and harrows, taking care not to spring-tooth too deeply. The plant, like wheat, prefers a fairly solid footing for the root just below a finely worked seed bed surface. By careful treatment, the fallow can be treated to retain sufficient moisture to germinate the seed without any rain. This is an advantage over germination by rain, as the rain tends to compact the seedbed mulch overlying the solid underlay, thus consolidating the whole and excluding air that is necessary for the plant.

The second ploughing should be done just prior to sowing, and as shallow as possible. If using a 3-furrow plough, one harrow can be drawn on an outrigger. In any case, do not fail to harrow up every night what has been ploughed during the day. This helps to conserve all the moisture, or a far greater percentage than if the land is allowed several days to dry out and the moist furrows to become "biscuity". I prefer rolling the ground before drilling. Not only does this make a nice surface for drilling, but it breaks up the clods and presses the surface nearer to the moisture below, and the seed is actually inserted into the moist underlay and germination seems to begin almost immediately. In fact, the plants appear above the surface in from 5 to 6 days. After the drilling is completed, a light harrowing is necessary, but only the one rolling. 18 to 20lbs. of Millet seems to be about the quantity for the conditions on my holding. Feeding off should be commenced when the crop has reached about 6 to 8in. in height.

Up to the time of writing, not one case of bloat nor any sickness has occurred in my herd through Millet. Cows are very fond of it. It contains no undesirable flavour, and produces milk more free from pasture flavour and gases than the ordinary paddock grazing. It is a good practice to have a couple of plots and feed them alternately. This gives much longer feeding, if the plots can be given a rest of one week.

Youth on the Farm

[H. R. Stevens, Cambrai (Murray Plains Conference).]

Why do we hear so many farmers complaining of the lack of interest shown by their own sons in the work of the farm? The youth of to-day certainly does more thinking and is further advanced generally than the youth of the past in general knowledge. This, possibly, is the outcome of a better education, not only at school but by reading, the wireless and the cinema, which all bring many things within his compass.

The wider outlook of youth must necessarily be treated in a different manner from the days of yore. In years gone by, sons did as they were told more than they do to-day. Home discipline was stricter, but in the present age, the son is able to offer his father sound points of view in discussion. In days gone by, many lads were in charge of the plough at 10-12 years of age; the tendency to-day is to allow the son to idle his time at odd jobs, while Dad takes the team and the lad is often 16 years of age and over before he handles the team. Did not your fingers itch to hold the reins of a team, and deem yourself a man when you did so? In letting the lad wait there is a tendency to build up indifference and an inferiority complex, leading to diffidence and lack of interest. The lad is left too much to odd jobbing, and his interest wanes and discontent is bred. Therefore, it is suggested that too much odd jobbing dulls the edge of agricultural husbandry.

If a farmer is so situated that the lad must do the odd jobbing, give him something to work for. Most farms have pigs, and as the lad feeds all the pigs, give him 2 to fatten for his own personal gain, and let him have them in a separate sty. The lad should be expected to keep an account of all expenses and income appertaining to his pigs, and be allowed to pocket the profits as payment, but in return the rest of the pigs must be fed in the same ratio. The same system could be worked with sheep, if the person be a sheep farmer, encouraging the lad to learn the points of a good sheep and the qualities of wool, etc.

Perhaps the farmer is essentially a cereal producer; well, would it be too much difficulty to allow the youth to plough, work, seed and reap 5 acres of a paddock under dad's strict supervision, leading the lad to take a pride in his work, and allowing him to keep the profit from his 5 acres? The boy then learns something about management, and also of the disappointments of a farmer's life, and when dad passes on unexpectedly, as it sometimes happens, the son will be quite capable of carrying on.

There are so many lures to other walks of life that the youth of to-day needs sympathetic treatment. Encourage a boy in his hobbies, and teach him that they are not his work, but a recreation after the ordinary tasks are accomplished. If the Australian farmer's son is encouraged a little, there will not be the cry "Back to the Land."

Predominance of Mechanical Power

[L. Royal, Cambrai (Murray Plains Conference).]

On successful primary production depends the welfare of Australia; so that it is necessary to take into consideration all points in favour of the progress and continuity of production. Secondary industries depend more or less on the success of the primary producer. Primary producing covers various occupations; but this paper refers solely to the production of wheat.

Granted that the products of the farmer are returning a payable price, one of the major problems of the day is to make working conditions on the farm compare as favourably as possible with working conditions of city workers. The young man on the land knows the hours and conditions the city worker has, which have been set down by Arbitration Courts, and all realise that the drudgery of farm work must be abolished, otherwise the drift of young men from the land to the cities will continue, thus tending to weaken the backbone of this country. One hears occasionally the old saying "What was good enough for our fathers is good enough for us". That is true, because our fathers had the best that could be obtained at that time, and we are entitled to the same.

Years ago when chaff cutting and wheat cleaning with the winnower were done with horse power, one realized the remarkable change that took place when engines were introduced to do this work. To-day, it is mostly done by engines—on some farms the chaff cutter is now driven by electricity which is supplied from the big cities. This power is a great improvement on the petrol driven engine.

The harvesting machinery commonly known to most farmers as the Binder, Reaper, Harvester, Header and Auto Header, is all modern machinery helping to make harvesting easier, faster and more economical than the methods used in earlier years. To be effective, this machinery, with the exception of the Auto Header, had to rely on horse power, nowadays the horse is deprived of this work.

The tractor, although not in its infancy, is becoming more popular every day, and supplying the power that is required to haul these implements. The tractor of to-day is much superior to the one manufactured 10 years earlier, the introduction of the pneumatic tyre and a much improved mechanical construction being responsible for the change.

Reading of the sale of some of the leading draught horse studs in South Australia recently, one can imagine the feeling of regret the owners had, after years of enthusiastic concentration and the enormous expense incurred by the introduction of some of the finest Clydesdales of the world, to see the tractor predominating. The transport problem of yesterday is no longer a worry to the farmer; with the aid of motor lorries with a carrying capacity up to 8 tons or more, the carriage of livestock to the markets and all general transport in connection with a farm is done so much faster and cheaper than with horses.

In the olden days a journey of 100 miles took about 3 weeks—the first week preparing, the second week travelling and the third week (thereabouts) to recuperate. The modern car to-day, with wireless installed, covers the same distances in from 2 to 3 hours, and the passengers listen to the news of the day whilst travelling in comfort.

For the people who find travelling by land a little rough or slow, there is the inauguration of the air services with their network of air routes throughout the country. To be in Adelaide for breakfast, Melbourne for morning lunch, over the Australian Alps by mid-day, and in Brisbane before sunset is an achievement our forefathers did not even dream about. Now this happens daily.

All these alterations go to prove the predominance of mechanical power, and so time marches on.

The Destruction of Mallee

[R. H. Pietsch, Cambrai (Murray Plains Conference).]

In this district there are three methods usually adopted by which mallee can be destroyed, namely: Grubbing, Mullenizing, and rolling. Grubbing was employed before stump jump implements were built It was a very slow process, but very effective; once grubbed, the land was clear for ever and there were no shoots to cope with. After the stump-jump implements came into use, the heavy timber was Mullenized, and the lighter scrub was rolled. Ever since there has been a sale for wood it has been less expensive to clear scrub suitable for wood. Within 50 or 65 miles of Adelaide, wood is worth about 1s. to 2s. per ton standing, and scrub of that type will cut from 7 to 10 tons of long Mallee per acre; therefore, the clearing would show a profit.

The next work is burning. If done in good weather, 1s. per acre should cover burning and picking up sticks. If the ground is not to be cultivated, the shoots must be cut. This will cost about 7s. 6d. per acre for 3 cuttings. If the land is to be cultivated, the next procedure is to work the ground with a disc plough, which will go through a fair amount of light sticks and roots without becoming chocked. A disc drill is most suitable as a seeding implement, apart from the stump-jump combine. If a crop of 6bush. or over to the acre is grown there will be sufficient stubble to fire-rake. Fire-raking done in February will scorch and kill at least 50 per cent. of the shoots in the first year. It is advisable to sow again the following year, and if successful in growing another crop, a further stubble burn will leave very few stumps alive.

The poor type of Mallee country is the most expensive to clear. Generally the scrub is only suitable for rolling, and will cost about 6s. per acre to roll and 1s. for burning. This type of country is seldom suitable for cultivation, therefore, the shoots must be cut either with a shoot-slasher or a mattock. As an all-round tool a mattock is preferred, the slasher is quite effective where the shoots are small, but in rough country it is rather trying on the man, as he cannot avoid hitting stumps and stones. With the mattock the shoot is cut off at the stump, leaving a neat job such as cannot be done with the slasher, which leaves about 6in. of growth on the stump. In the first year it will cost about 3s. 6d., the second year 2s. 6d., and the third 1s. 6d., making a total of 7s. 6d. per acre. The bulk of the shoots should be killed in these three cuttings. The best time for this work is during February and March, as the sap is then up in the shoot. The shoot will sprout again during winter, and many of them will be cut by frost. Sheep in the paddock are a great help; they will nip off the tender shoots and thus retard their growth.

After the stumps are dead—in about 8 years—most of them will lift out with a bar and will realise about 10s. per acre over expenses. The total cost of clearing poor type Mallee is:—

	s.	d.
Rolling	6	0
Burning	1	0
Shoot cutting	7	6
	14	6

against a return from stumps after 8 years of about 10s. per acre.

Feeding Sheep

[E. OWEN BROWN, Cambrai (Murray Plains Conference).]

Few farmers seem to realise the necessity for keeping their sheep in good condition from shearing to shearing. Nearly every year sheep become fat during spring, retain fair condition during summer, and become poor and in many cases poverty-stricken during autumn. In regard to breeding ewes, this is a most important period, for it is just as necessary that the lamb be well nourished before birth as after. It is not uncommon to see a farmer deliberately starving his sheep in order that they will have a good paddock to lamb in, and he then wonders why the lambs are disappointing. If the sheep has not sufficient to eat at this time, the wool stops growing, sometimes develops a break in the staple, and the weight per head might easily be reduced by 2lbs. or more. Also, most of the deaths which are attributed to natural causes occur during months May and June.

ENSILAGE.

When feeding sheep on the farm the two most important factors to be considered are time and expense. So far as the fodders which are best suited to this district are concerned, first and foremost comes ensilage, against which the average farmer seems to have an unaccountable prejudice. Made and fed properly, ensilage is quite equal to the best natural grasses for the maintenance of health and vigour in flocks, and it is by far the cheapest. It is easy to make, keeps for an indefinite period and is not subject to loss by fire, weather or mice. Ensilage can be made in three ways, by silo, pit or stack, the last being the easiest and least expensive. Practically any form of green herbage may be utilised; wheat, oats, and barley being very suitable. In this locality there are many patches of sand where rye could be grown to advantage and made into ensilage. The best time to cut the crop is just after the plant flowers, when the grain is in the pulpy stage.

It is necessary to exercise care in building the stack, and when completed, apply great pressure to the top by means of old posts, stones, &c. A 5-bag crop of wheat cut for ensilage should yield 5 tons per acre, and the ration for a lambing ewe is 2½ to 3lbs. per day. Thus an acre of wheat or oats made into ensilage would feed 560 ewes for a weekly cost of 1½d. per head per week. When feeding for a short time only, ensilage is a sufficient ration in itself, but if used for an extended period it is advisable to add, say, 2ozs. of sheep nuts or other concentrates per day; the sheep is an animal which requires a large amount of protein.

Another good sheep feed is hay. If wheaten hay is made from a strain with a soft, sweet straw and cut on the green side, sheep will eat it whole, and it is not much trouble to throw them a few sheaves each day. Oaten hay is more liable to damage by mice, and if cut at all green it has a bitter taste. If chaff has to be cut, bagged and fed in troughs, it usually happens that the sheep are not fed at all; also, if feeding hay, it can be distributed in different parts of the paddock, which is a great advantage with lambing ewes, for it ensures each one getting its share. Most people make the mistake of feeding always in one corner of the paddock, with a result that half the sheep go without feed.

Rations.

To keep dry sheep in strong condition, 1lb. of good hay or chaff per day is sufficient, but with breeding ewes it is necessary to add a concentrate to increase the milk supply. For this purpose sheep nuts or oats are recommended, the former is by far the cheaper, as the following table will show:—

2ozs. of sheep nuts per day at 1½d. per lb. = 1½d. per sheep per week.

8ozs. of oats per day at 1d. per lb. = 3½d. per sheep per week.

Unless the ground is very hard, concentrates should be fed in a trough; sheep will die as a result of picking up too much dirt. A trough can easily be made by sewing wheat bags end for end, threading a wire through on each side, straining at the ends and supporting with iron posts about 9ft. apart and 18in. high. The feed is more easily distributed when the troughing is about 25 per cent. longer than necessary. When feeding concentrates, sometimes there is sufficient roughage in the paddock, but no nourishing feed. The ewes are lambing and must not be disturbed. When faced with this difficulty, distribute a sheaf of hay here and there to attract the attention of the sheep and place the concentrates nearby.

If the paddocks are really bare, the best plan is to shut up the sheep in a small space and feed a full ration. On one occasion I shut up 800 breeding ewes for 6 weeks during lambing in a 20 acre paddock, and fed on the following:—¾lb. good wheaten hay per day; 2ozs. sheep nuts per day. At present prices the total cost was 4d. per head per week. The ewes reared 70 per cent. of lambs and cut 11lbs. per head of wool at shearing time. The result would have been better still had it not been for a particularly cold snap, during which 30 lambs died. In most districts a good sheep lick is essential, especially when feeding. The following are both cheap and satisfactory:—Salt 1 part; di-calcic phosphate 1 part. Mix with a sufficient quantity of molasses, or a mixture of molasses, Epsom salts and salt. The evening is the best time to feed, and if possible the diet should be varied occasionally. It is a mistake to allow the sheep to become weak before commencing to feed; they are then unable to digest the food properly and will not improve. The common practice, which has been responsible for heavy losses, is to discontinue feeding as soon as the rain comes. If it is possible to have a hospital paddock, the weaker sheep can be attended to and a post mortem held on any that die, thus sometimes avoiding further mortality.

FEEDING TABLE SUITABLE FOR THIS DISTRICT.

For Dry Sheep.—1lb. of good hay or chaff per day, costing 3d. per head per week; or 2½lbs. ensilage per day costing 1½d. per head per week.

For Breeding Ewes.—1lb. hay or chaff and 2ozs. sheep nuts per day, costing 4¼d. per head per week; or 1lb. hay or chaff and 8ozs. oats per day, 6½d. per head per week; or 2lbs. ensilage and 2ozs. sheep nuts per day, costing 2½d. per head per week; or 2lbs. ensilage and 8ozs. oats per day, costing 4¾d. per head per week.

For purposes of comparison I have allowed—£4 for a ton of hay or chaff, 10s. for a bag of oats, £13 for a ton of sheep nuts, 17s. for a ton of ensilage.

These quantities are a full ration, sufficient to keep a sheep strong if not in forward condition. In most cases, having some natural grazing, possibly a half ration would be quite sufficient. Sometimes it is advantage when the season looks unfavourable to take say half the sheep out of a paddock, feed them by artificial means, and leave the remainder entirely alone.

Sheep in this district can be kept strong throughout the year with a minimum of work and expense, and any money spent in this way will be repaid several times over by increased returns.

Papers Read at Branch Meetings

Cement and Its Uses.

[O. P. WALLADGE (Wirreanda).]

For building outbuildings such as motor garages, implement sheds, &c., select clean gravel, if possible not larger than a hen's egg, containing also about 5 per cent. of sharp sand. Then procure clean sand. If clean sand is not procurable the sand can be easily washed in an old bath, trough, or large tub by changing the water to every 1cwt. of sand, and spreading the sand to dry on a bag sheeting. This is most important, as the sand must be practically dry for the dry mixing, which will be required for the plastering of the walls. The quantities of material are as follows:—To every six buckets of gravel add one bucket of cement. Mix thoroughly by turning three times from right to left. Then add the water and mix thoroughly, turning three times. Use hoop iron, scrap iron, or barb wire for reinforcements in the wall and work the concrete in tightly with the shovel. The thickness of the wall depends mostly on the size of the building. Generally a 6in. wall is sufficient for the man on the land. The plaster mixture for the walls is two to one, and it should be applied while the walls are damp. The plaster coat should be kept damp for several days. Old water tanks can be made to last a lifetime with cement. No netting is required, as the galvanized iron has a rough surface. Clean out the tank sides thoroughly with a scrubbing brush, then firstly put a 3in. concrete bottom containing six to one. Then let it stand for a few hours, when the sides can be plastered just to the full of the corrugation and left rough. This coat is three to one. Start at the top and work a space 3ft. wide to bottom. By the time the first coat is completed one can proceed with the second coat at the starting point. This must be two to one mixture, and ⅜in. thick. Then apply a third coat of half and half, float well, and fill with water in 24 hours time. Tanks of any particular height must be supported with struts to stop vibration from wind. A 3,000gall. tank will require six bags of cement, and should be completed in two days by the average mason with an attendant.

Sultana Dipping Experiment.

Reviewing sultana dipping experiments that he had been conducting Mr. A. C. Ingerson, at a recent meeting of the Berri

Branch, said that where a dip solution was kept at 185° heat, the drying racks not more than 4ft. wide, with plenty of rack room and fruit not laid on in layers too thickly, and given ample time to dry before being pulled off and laid out on hessians in the sun to finish off, the best results were obtained. The speaker emphasised the fact that growers had not sufficient rack room for their sultanas, were too anxious to take off the first lot of sultanas placed on racks, and thus caused much of that fruit to go dark in colour and so spoil a good sample, whereas if rack room had been sufficient for the whole of the crop, it would have meant the grower having an increase very often of one or two grades more when he delivered the fruit at the packing shed door.

In the discussion that followed Mr. Ingerson's address, many growers stated that last season they had gone to the expense of putting up extra rack room, with the latest ideas in rack building, and had already received some of the benefits that had been pointed out. Weather conditions over which there was no control played a big part in the samples, but by doing all that was possible to evade those troubles, and not prolonging harvesting, a better tonnage and a better credit balance were received at the end of the season.

Care of Farm Horses.

[G. C. Boundy (Brentwood).]

It is a wise plan for farmers to breed the new-type Clydesdale—a class of horse that will always be in demand, and one that will be worthy of the care and attention that a farm horse should have. The dipping of horses for itch may seem rather costly, but one will be more than pleased with the trouble and outlay when going around the paddock to find all the posts standing up as they should be and not have to put in half a dozen dummies every day to keep the fence in repair. The best time to dip is September, and the cost is approximately 3s. 6d. per horse. Horses should be drenched annually, in the summer months. A good, cheap, and very efficient drench is 1 bottle of raw linseed oil and 2 tablespoons of turnpentine. If a horse does not look well after this treatment get in a veterinary surgeon, as blood worms are no doubt in evidence. Alternatively, shut up the horses and starve them for 24 hours, then give a physic ball to each one. After that give 1 tablespoon of solution of arsenic in the chaff every morning for 14 days.

A good stable, warm in the winter and cool in the summer, will go a long way towards keeping horses fit and in good working condition. After long spells horses should be stable fed for a few days before beginning work. It is advisable to work them 2 or 3 hours on the first day, gradually increasing the length of time until at the end of the week the team should work full time without showing signs of distress. If horses are worked full time from the start, they rapidly fall away in condition, besides getting badly scalded shoulders. Working horses are only capable of doing a given amount of work each day. If pushed beyond this point they lose condition, and will not do any more work; in fact, not as much, because the team will be worn out, and not be able to travel so well. Horses should have as much water as they will drink at least three times a day, and good food, for preference oaten hay chaff. Regular feeding is of great importance. Always feed enough, but not too much. Be sure the horses eat all the feed that is given them. Horses should have free access to water. They often drink poorly when they first come in from work. Do not work horses after sundown, because the sweat will not dry over night, and may cause a chill. Horses should be well groomed each morning befor they are put to work. This not only adds to their appearance, but helps to keep them in good health. On no account should horses be tied up over night; if they are managed correctly they will all feed together at a long manger quite contendedly. Teams should be driven home from work and not let run loose, especially when there are brood mares among them.

Sore Shoulders.—Prevention is always better than cure. Slight sores at times may be difficult and perhaps impossible to avoid, but if a team of horses is well cared for one will seldom find sore shoulders. Collars should fit well, and be kept well lined and stuffed; sweat marks and dirt should cleaned off the collars and the horse's shoulders each morning before commencing work. The chains should be of equal length and free from wire links.

Mares in foal should be worked on the outside of the team where they are not so likely to get bumped and thus cause loss of either mare or foal. Mares in foal should not be turned out in the paddock to spell; they are likely to become over fat, and when in this condition there is a danger of serious trouble at foaling. Mares that are used for breeding purposes should be kept out of any very heavy pulling. Ordinary work will not hurt them; in fact, they should have light work until within a few days of foaling. When mares are about to foal they should be put in a separate paddock, if possible near the house, so that they can be watched and have attention if necessary. Until foals are strong enough to look after themselves keep them with their mothers away from the other horses. When a foal is only a few days old it should be caught and handled, and have its legs lifted. A small halter should be put on the foal, and it should be tied up for a few minutes. This handling should be repeated every few days until the foal is thoroughly used to it, then it should be taught to lead. Well-grown colts should commence working at two years old, but give them only about two hours a day, and only two or three days a week. Commence breaking in young horses during fallowing. A few hours lost time then is not nearly so important as in the busy periods.

Pinnaroo.

[A. O. Nietz (Pinnaroo).]

Name.—The word "Pinnaroo" is an aboriginal word meaning "Big Man." The name was originally used to refer to a very big district east of Tailem Bend, but now is more precisely the name of the hundred and of the town. There is no known reason why "Big Man" should have been applied to the district.

Position.—Pinnaroo town is situated almost due east of Adelaide in Latitude 35° 30′ S., and is only four miles from the border of South Australia and Victoria. Murrayville is the Victorian town across the border, and is the nearest Victorian town to Adelaide. It became well known to people in Adelaide when "bus" proprietors gave Murrayville as their destination owing to certain by-laws. By road, Pinnaroo is 163 miles from Adelaide, and 364 miles from Melbourne. As the distance from Adelaide to Melbourne *via* Pinnaroo is thus 524 miles, as against the 605 miles of the more scenic Prince's Highway, and as the roads are better than the shorter route through Bordertown, the town is becoming increasingly important as a calling place for tourists. During the South Australian Centenary Celebrations many visitors passed through the town, some of them remaining over night. The larger petrol distributors have depots there.

The nearest town on the River Murray is Loxton, which is 76 miles to the north, while Renmark is 33 miles further on. A fairly good road connects with these towns, and carries considerable traffic, as many commercial travellers and others make the round trip—Adelaide, Pinnaroo, Loxton, Waikerie, Adelaide. Much of the fruit and vegetables sold in Pinnaroo are brought from Renmark along this road.

Bordertown is 76 miles to the south. At present only a rough track connects the two towns, but requests for a good road have been made, and it is very probable that one will be constructed in the near future. It would be an important link between the two big centres—Mount Gambier and Renmark.

Pinnaroo is in the centre of the mallee lands east of the Murray, and is often referred to by its more enthusiastic inhabitants as "The Capital of the Mallee." It is certainly the largest and best-known town in the area.

County and Hundred.—The town is in the Hundred of Pinnaroo in the County of Chandos. This county was proclaimed in 1893, and has a total area of 1,677,000 acres, and contains the hundreds of Auld, Billiatt, Kingsford, Peebinga, Cotton, Bews, Parilla, and Pinnaroo. Its eastern boundary is the South Australian-Victorian border for the length of 65 miles, and it extends west for 41 miles. Its southern border is really the edge of the so-called "Ninety-mile Desert." The Hundred of Pinnaroo is in the south-east corner of the county, and is 10 miles by 21 miles, containing 134,400 acres. Pinnaroo is almost in the centre of the hundred, which contains no other towns, but has several small centres. These are Parilla Well, Yarrahville, Chandos (with a railway siding), Oak, and Rosy Pine. Each of these has its own school and hall, but has no post office or stores, so that all in the hundred come into Pinnaroo for their mail and supplies. Friday is the main shopping day. Every Friday afternoon and evening there is great activity in the main shopping centre, and cars line the street. The street named Main Street in the survey was passed over by the business people, who built their shops, stores, banks, and hotels in the street besides the railway. This they undoubtedly did to get a more central position, and also because there would be less cartage of goods from the railway, and they would be prominently and more conveniently placed for new arrivals. The institute, post office (though a block was set aside for this purpose in Main Street and is still vacant), council chambers, and police station are in this street also.

The Town.—The town is modelled on Adelaide: the streets are at right angles, and it is surrounded by parklands. In these are the public school, hospital, and show grounds, and they contain the Soldiers' Memorial Park, golf links, and tennis and croquet courts. Outside the open spaces are the two "suburbs"—McKenzie Town on the south and Hillcrest on the north. The former takes its name from one of the pioneers, and the latter from the fact that the houses are built on a sand ridge overlooking the town. The general appearance has been greatly improved by the planting of many gum trees in public spaces. Mr. Harfield, once head teacher of the Pinnaroo Higher Primary School, deserves the thanks of the community for his efforts in this regard. As the railway is so centrally placed in the town, and because the activities of the town and district would be impossible and useless without the railway, we may now consider the events connected with its construction, and the early history of the district.

Natives.—Very few traces of aborigines have been found here, and this region has probably never been populated with them. Only twice in the last 6 years have bones of natives been found. A flint axe head was found by a farmer, and he brought it to me, but as it was only found a few years ago on the surface of a clay flat, it is almost certain that it was brought here by a white man. In the extreme south-west of the county, at Bairn Hill, there is a native burial ground. It is probable that in the wetter seasons when the waterholes were full, wandering groups from the River and Lakes districts crossed the area and hunted, but because of the lack of water the place would be completely deserted in the summer. Early settlers give no records of natives at all.

Early Days.—One of the very first to take up land was Mr. William Butcher, who took out a pastoral lease in 1870. He erected a hut and began a sheep station, and also kept a few horses and cattle. A waterhole about 25 miles north of Pinnaroo is still known as "Butcher's Soak." Butcher's station was taken over about 1880 by Messrs. John H. and William H. Hensley, and Mr. William Hensley and his wife lived on the station for many years. A house of 12 rooms, built of pine, plastered over to look like stone, was erected where Main Street is now. Costly cedar, walnut, and marble-topped furniture and a piano were brought on wagons from Coonalpyn, the nearest railway town. The roof was mainly thatch, but some was of iron. A pepper tree which was in the front garden is still growing in Main Street. Where Pinnaroo now stands were cultivation paddocks, and the sand ridges were covered with native pines. The station extended to near the present northern boundary of the hundred of Pinnaroo, on the east to the State border and to the west within about 6 miles of where Lameroo is now. There were no bores, only wells and dams on the run, and Scrubby Springs, now dry, was an important water supply. Hensley soon found the wild dogs too numerous, and so only a few sheep were kept in enclosures, and more horses and cattle were kept. A man named Sam Gibbs was a professional dog catcher employed by the station owners, and probably there were others similarly employed. Jack Gibbs was often in the district kangarooing. Kangaroos are still to be found to the south of Pinnaroo in the unsettled areas of the "Desert." Hensley left and appointed managers: first, Mr. Bartholomew, and in 1886 Mr. Poyntz, who is at present connected with the S.P.C.A., and to whom I am indebted for much of this information. Stores, &c., were brought on wagons from Bordertown or Coonalpyn. There were water soaks along the track, and the round trip took from seven to eight days. In 1889 Hensleys shut up the station altogether, and only a few head of cattle were left running wild. Their lease expired in 1894. When the Pinnaroo Railway Bill was before Parliament much mention was made of the Hensley sheep run, and the opinion of Mr. Hensley that the land was no good and that the railway should not be built was often quoted. It was said Hensleys spent £20,000 on the run and lost the lot.

Care and Management of Chaffcutters.

[A. E. Hein (Monarto South).]

Chaffcutters, like all machinery, require to be set on a solid foundation in the earth to ensure absolute rigidity and steady working. A machine set on an unsound foundation will not run freely and will soon commence to work and vibrate in the joints of the framework, and undue wear will take place in all bearings and spindles, causing heavy driving.

In order to get the best results from a cutter it is essential to feed it correctly. A good even sample of chaff can be obtained only by keeping the mouth of the cutter continuously full. When placing a sheaf in the feed trough it should be spread out and the next sheaf overlapped to form a continuous flow of hay of uniform thickness. The sheaves are best fed with heads forward. It is a wise plan to practice keeping the fingers of the left hand as much as possible across the feed trough when feeding. If this is made a practice there is no danger of the fingers being caught and drawn into contact with the feed rollers.

During summer months the hay becomes very brittle on hot days. If cut while in this condition it will break to powder and become very poor horse feed. This can be improved by sprinkling with water, either through a hose or watering can. Care must be taken not to apply excessive moisture, or the chaff may mould and become useless. There should be just enough moisture to give the hay a feeling of toughness.

The chaffcutter cannot do satisfactory work if the knives are neglected. They should be kept sharp and in correct adjustment. They will gradually leave contact with the steels on the mouth. When this is noticed they should be reset by means of the set screws. This should be carefully done—a quarter of a turn of the set screws making the difference between correct and incorrect setting. When correctly set they should have a slight even rub on the mouth steels from end to end, like a good pair of sheep shears. When the outer edges of the mouth steels become worn unevenly, they should be taken off and reversed. Blunt knives will use much extra power, and a bad sample of chaff will be the result. When the knives are being sharpened with a file, the edge should be kept as long as possible, or as near the length of the maker's edge as it can be kept. If the edge becomes very short the knives should be taken off and ground back to a longer edge.

Efficient lubrication is very important for the successful working of any machine which has revolving spindles. A chaffcutter, when working, is always surrounded by a cloud of dust. This dust is always entering the bearings in small quantities. If this is left to continue for long periods without lubrication, the oil in the bearings will soon be dried up and heating and cutting will soon set up. The chaffcutter should have frequent applications of good lubricating oil. Special attention should be given to the reversing clutch pinion on the knife wheel spindle. This pinion runs at a high speed, and if allowed to run dry it will often cause a loud screaming sound.

Chaffcutters generally are well made, and of good material. If the machine is left out in the open where the rain and sun have full play, it will deteriorate much faster than if kept under a good shed. Exposure will do more harm than the actual work on an average farm. All bolts and nuts should be kept tight, and broken ones should be replaced.

Driving belts should not be worked too tight. There should be just sufficient tension to drive the cutter. Excessive tension will only add to the driving power needed and cause extra wear. With reasonable care and attention a chaffcutter will give the owner years of good and profitable service.

Wool Production—Wrinkly and Plain-Bodied Sheep.

[A. M. Bryant (Nantawarra).]

In discussing wool production it is essential that the type of sheep should be selected to enable an evenness of type of wool to be produced; at the same time culling any crutch wrinkles. The wrinkly type of sheep cuts a greater weight of greasy fleece than the plain-bodied type; although when scoured the ultimate yield of each of these types is only slightly different, being better in the wrinkly type of sheep. The plain-bodied type of sheep produces better and more attractive fleeces, and can be classed into top lines, better suited for commercial purposes. Staple length is slightly longer in the plain-bodied sheep. Spinners say that the two types are equal to each other for their requirements, so for this purpose the grower has little to contend with.

The grower, especially if he is a farmer and has a flock of wrinkly sheep, at shearing time will find much sand in the tip of the wool, particularly if the flock has been kept on fallow land for a portion of the year. This is due to the fact that a wrinkly-bodied sheep has in the fleece yolk of greater quantity, and this accumulates sand which adheres to the fleece after it has been shorn from the sheep. After the wool has been baled the sand falls through the cleaner portion of the wool and the whole of the fleece becomes dirty. The plain-bodied type of sheep has wool with yolk which does not seem to catch so much sand. Darker tips will show in the wool of the wrinkly type of sheep, whereas in the plain-bodied sheep the tip is less pronounced.

To sum up, the wool from the wrinkly type of sheep is heavier, and that from the other type is longer in the staple, although lighter. Wrinkly sheep are more susceptible to blowfly strike and consequently need more attention, but it must be remembered that careful attention should be given to the flock at all times, whether the sheep are of the plain-bodied or wrinkly type. A check in the growth of sheep will adversely effect the growth of wool, so culling out poor sheep is advised.

Hay.

[W. Joppich (Murraytown).]

Hay has been known as the main means of stock feed for many years and is well worth discussion.

First the area sown for hay purposes should be sown near the place of stacking to avoid long distance carting; this also saves time at a busy period. The sowing for hay should be done in the earlier part of seeding at a rate of not less than 60lbs. of seed per acre, with a liberal quantity of super (about 1cwt. per acre), to encourage a good bulky growth. The sowing of a hay variety outside the crop along fences and creeks where tracks are to be cut, is also an advantage.

Varieties.—The varieties sown for hay should be of an early nature, such as King's White, Sultan, Sword, or Ford, for two main reasons. Firstly, to enable one to go on with the cutting in good time before the grain varieties are too far advanced; and secondly, because early varieties can hold their own better if sown on weed infested ground where weeds may germinate at the same time as the sown seed. Oats, such as Early Burt and Guyra also make good hay.

Cutting Hay.—Hay should be cut while the sap is still in the stem in preference to waiting for too much grain. The Sword variety is inclined to be very "strawy" or brittle if cut on the late side. Mice also do more damage when there is a good percentage of grain in the hay. For feeding dairy cows, hay cut on the green side is of much benefit. The sheaf should be tied reasonably firmly and neatly for stacking and handling purposes.

Stooking and Stacking.—Stooking the hay as soon as possible after cutting helps it to retain the quality and colour, but where quick drying is desired it may be beneficial to leave the hay lie for several days, providing the ground is not wet. From 15 to 20 sheaves are sufficient for an average stook, and they should be dry enough for carting and stacking from 10 to 14 days with reasonable drying weather. A twelve-month supply should be stacked handy to the chaffcutter, using either a straw or wood underbed to prevent the bottom layers from being spoilt by dampness. Stacking the hay should be done thoroughly, always keeping the centre of the stack well filled to prevent wet from penetrating and spoiling the hay. When the stack is built up ready to begin the roof, a little extra pitch should be given to the centre before laying the eaves; and the extra pitch should be maintained throughout the roofing of the stack, giving the sheaves sufficient dip to run off the water. Sprinkling coarse salt on every other layer is well worth the cost, especially when hay has received an undue amount of rain between cutting and stacking. The covering of stacks with a good coat of straw as soon as possible should not be neglected. An extra stack of hay as a standby is a valuable asset to a farm, especially where a good amount of stock is carried.

The Agricultural Bureau.

[Mr. BEN. FROMM (Lone Pine).]

It is an honour to be a member of an institution such as The Agricultural Bureau. South Australia can boast of having perhaps the best organization of its kind in the Commonwealth. It comprises in round figures about 350 branches, with a membership of 7,000.

Such a State-wide organization could do a vast amount of good if all members pulled together.

The members of the Advisory Board of Agriculture will always give sincere consideration to any matter brought under their notice. The splendid staff of departmental officers are always willing to assist us in any way possible, and will come to lecture at our meetings with practical advice on almost any subject one can think of.

The Agricultural College with its scientists and experimentists has done a great deal for the State in general. Through their research work producers have been enabled to obtain an increased yield in return for their outlay. Bureau members have also done a lot of good for their fellow members, passing on their experiences and ideas on agricultural matters.

Lone Pine has now four life members possessing certificates to that effect. I would like each individual to ask himself: "Have I done all I could for the welfare of the Bureau? In particular our own branch?" Why are members losing interest in agricultural matters? These questions are open to a lot of discussion. The most important duties of a member to help and solve the problems are perhaps as follows: Attend meetings regularly and be punctual. Take part in the discussions that are before the meeting. This enables us to speak and understand how to address the chairman and to conduct the business of the meeting. It also assists members greatly to overcome any fears or shyness in public speaking. The discussion is an education on its own.

The writing of papers seems to be a difficulty and is not patronised as freely as it should be. This is a most wonderful opportunity of setting a few sentences together on some subject selected by the writer with which he is conversant. A short, sharp and shiny paper brings forth more discussion as a rule, and more ideas than sometimes a lengthy one.

To those who have not previously contributed anything to fill the empty space on the syllabus, do it now, and see for yourself the benefit and education you will derive therefrom.

The election of officers is another outlet for fresh talent. They should be changed frequently; by so doing interest may be better maintained, and it gives everyone a chance of taking a fresh responsibility in the affairs of the branch.

Last, but not least: The success of the branch lies entirely in the hands of its own members.

Producers' Bookkeeping with Special reference to Vignerons.

[Paper read by W. M. Ashby at a meeting of the McLaren Flat Branch.]

The beginning of commercial transactions dates back practically to prehistoric times, but the keeping of actual records of them in any sort of a methodical manner is of quite recent origin. The basis of our modern system of bookkeeping can be traced back to the thirteenth century when Venice, its birthplace, was at its apex of commercial importance. In 1796 Jones' English System of Bookkeeping by "Single or Double Entry" appeared, and by the middle of the nineteenth century a marked advance had been made. To-day bookkeeping in all its forms may be termed an "Art and a Science," and its importance is recognised by every business man in city and country alike. The day of rule of thumb method and casual guesswork is over. Success in business depends upon three basic factors—supply of capital, technical efficiency and prudence—the three of them depending upon the transactions as recorded in the books. It is true that one can be successful in business without keeping books, but it is equally true that many enterprises fail because of the lack of proper records. No man can be compelled to keep books, but two Acts—Taxation and Bankruptcy—can give considerable worry, anxiety and expense to anyone who becomes involved without proper records having been kept, since these Acts demand that books be kept by anyone engaged in business.

In far too many cases the cheque book and bank passbook still form the only record available in the affairs of many producers, but at best they divulge nothing beyond actual cash transactions by way of deposits and drawing. In many cases the passbook is of little use for guidance since it contains cheque numbers only on the debit side and deposits as a lump sum on the credit side.

Every business man should have some more informative system of bookkeeping—not necessarily "double-entry," but nevertheless a system as complete as possible—without making it irksome or cumbersome. The following system, based upon practical experience over a number of years, is recommended as thoroughly effective for both personal and taxation information:—

1. Obtain an ordinary day book and call the left page "debit" "income," and the right page "credit" "expenditure." These two pages should be sufficient for a week's transactions for both cash and credit transactions, hence super-scribe them with

"week ending .... 1938."

Under the heading "income" enter date, firm name, nature and amount of any amount received, while under "expenditure" all payments made should be recorded by date, firm name, nature, and amount, together with cheque number if paid by cheque. Bank deposits should be recorded on the debit side; withdrawals should be recorded on the credit side.

2. At the end of the week these items should be posted one by one into the "dissection book," containing accounts for purchases, sales, bank, and the various types of expenses.

From these particulars, if carefully recorded, little difficulty should be experienced in the compilation of a profit and loss account and a balance sheet. (Note the correct forms.)

If some such record of keeping trace of the income and expenditure were adopted producers would save themselves endless trouble and inconvenience when the time arrived for them to make up their "statistical and income tax returns." Moreover, they would be better able to tell just where losses, leakage, extravagance have touched them most.

The following rules are appended as finger posts that lead to the road of efficiency:—

1. Separate "domestic income and expenditure" from business accounts.

2. Deposit all income and make all payments by cheque.

3. Make out all cheques to the order of the payee and preferably cross them with the words "not negotiable."

4. On cheque butts show date, firm name, nature of payment, and amount.
5. Do not pawn your credit in any shape or form if you can avoid it.
6. Do not keep your money idle. Turn it to productive use.
7. Be progressive—every day brings something new to us. Study it and see whether its use can be to your advantage.

The Care of Stock.

[T. J. Goode (Kingston).]

Sheep.—Dipping in a reliable arsenical dip is most necessary, as ticks and lice greatly impair the health of the sheep. Lice will also greatly damage the wool. I recommend a dip with a bowl on the entrance end. Sheep must be lifted and dropped in tail first with backs towards the outlet of the dip. The dip manufacturers recommend that sheep should be in the dip for at least one minute. If sheep go in facing the outlet this is almost impossible; the dip would have to be very long to keep a sheep in it for half a minute.

Water.—I advocate windmills with tanks and troughs, the latter not too long. The water becomes too hot in long troughs, and it is quite common to see stock go right up to the tank end of the trough to get a cooler drink. In the north of this State some pastoralists put covers over the troughs to keep the water cool. They have found that water from some bores will kill sheep if they are allowed to drink it too hot. Admittedly, windmills need more attention than open waterholes, and it is advisable to look at them at least twice a week during hot weather. Riding around stock fairly often is rarely time wasted, as there are so many things that can happen, namely, flies, sheep getting cast, and numerous other things. If lambing ewes in late winter or the early part of spring, when feed is very good, they should be put in a paddock where there is not too much feed for a week or ten days before lambing commences. Ewes must have exercise and should not be too full, otherwise losses are heavy in both ewes and lambs. I once lambed a flock of ewes on an oat crop and part of the same flock in a fairly bare paddock adjoining the oat paddock. The losses were very much heavier on the oats, with not such a good percentage of lambs. On another occasion a flock of ewes were on a very good paddock, and a week before due to lamb several died for some unforseen reason. They were shifted to a paddock with not so much feed. Several more died during the first two or three days, and then the trouble ceased. As soon as a ewe has got over the effects of lambing she should have the best feed available.

The main thing to do in the care of sheep is to see that they have plenty of feed and good water. At one time if they had these all was well, but to-day things have altered very considerably. Sheep can have an abundance of both and will die from disease, worms, &c., and must be drenched and given licks, especially if the country is carrying a heavy stocking. As time goes on the stock owner is confronted with more troubles, but fortunately scientists are teaching us how to overcome those troubles.

Drenching for Worms.—All lambs should be drenched with a bluestone-blackleaf 40 solution when weaned, and fairly frequently if there is any sign of worms. If in good condition and not showing signs of worms they should receive at least one dose when the dry spell breaks and another early in the spring; and they should be given free access to a reliable lick during the whole year. Two-tooths should also be drenched and given lick. Frequent changing to different pastures is of great benefit to young sheep.

Scabby-mouth is a disease that affects young sheep occasionally, and although not serious it will greatly affect their condition. I have seen them so bad with large hard scabs that they could not feed, and the flies were striking them under the scabs. For this equal parts of glycerine and Quibell's carbolic dip smeared on worked wonders; in fact, all the scabs had disappeared in a week.

Sheep should be wigged fairly often if carrying wool on their faces, especially if grass seeds are bad. They will not do any good with grass seeds in their eyes, and the wool of their faces seems to gather more grass seeds.

Crutching is another important job, especially since so much top-dressing is done. I recommend crutching during the first part of the winter, and even then sheep have to be cleaned up fairly frequently right on to the end of the spring. Riding around stock fairly often is rarely time wasted as there are so many things that can happen, namely, flies, sheep getting cast, and numerous other things.

If lambing ewes in late winter or early part of spring when feed is very good they should be put in a paddock where there is not too much feed for a week or ten days before lambing commences. Ewes must have exercise and should not be too full; otherwise losses are heavy in both ewes and lambs. I once lambed a flock of ewes on an oat crop and part of the same flock in a fairly bare paddock adjoining the oat paddock. The losses were very much heavier on the oats, with not such a good percentage of lambs. On another occasion a flock of ewes were on a very good paddock, and a week before due to lamb several died for some unforeseen reason. They were shifted to a paddock with not so much feed, several more died during the first two or three days, and then the trouble ceased. As soon as a ewe has got over the effects of lambing she should have the best feed available.

The main thing to do in the care of sheep is to see that they have plenty of feed and good water. At one time if they had these all was well, but to-day things have altered very considerably. Sheep can have an abundance of both and will die from disease, worms, &c., and must be drenched and given licks, especially if country is carrying a heavy stocking. As time goes on the stockowner is confronted with more troubles, but fortunately scientists are teaching us how to overcome those troubles. A neighbour who overcame this trouble has cement troughs (a little above ground level) surrounding the lick troughs. These are partly filled with a bluestone solution, and when the sheep go for a lick they must stand in the bluestone solution.

Cattle.—If given plenty of feed and water generally not much goes wrong with cattle, but they become infested with worms in the same way as sheep. There is one ailment with cows with sucking calves that may be worth mentioning. Towards the end of the summer cows will become very stiff and lame in the forelegs, sometimes so bad that they have difficulty in rising after lying down. I have come to the conclusion that this complaint is acute indigestion and possibly a lack of vitamins, and have found that if the calf is weaned and the cow put on green feed she will improve immediately.

In this district if rabbits are not kept well under control most of the work and care of stock is wasted. Stock and rabbits will not thrive together; the bunny will come out on top every time.

Agricultural Enquiries

[Replies by the Director of Agriculture (Mr. W. J. Spafford) to questions asked at at the South-Eastern Conference at Mundalla.]

Is a Barley Crop Detrimental to a Following Wheat Crop?

In any system of cropping in countries with Mediterranean climate in which both wheat and barley are included, there are two fixed rules which must be remembered, namely, that wheat crops must be preceded by bare fallow, and barley must not be followed immediately by another cereal, but the land must be left out for pasture or grow peas, or be bare fallowed before another crop is attempted. If a barley crop immediately precedes a crop of wheat, it is very seldom that full returns are obtained from the wheat crop. This happening does not appear to be because the barley crop leaves any injurious substances in the soil, nor is it due to the fact that barley removes more plant food from the soil than do the other cereals, but the ill-effect seems to be caused by the barley plants collecting much of their mineral requirements from the immediate surface of the soil, rather than from greater depths as do the other cereals.

Would it be Overtaxing Land to crop it on a System of 2 Wheat Crops Intervened with Fallow, followed by Barley and then Oats, for Grazing?

As it is essential in countries with Mediterranean climate to precede the first wheat crop in a rotation of cropping with bare fallow, the suggested system of cropping with its (1) bare fallow, (2) wheat, (3) bare fallow, (4) wheat, (5) barley, (6) oats for grazing, provides three crops, two bare fallows and one pasture in six years, which the good soils of the Wolseley district should be able to maintain for a fair period of time without becoming "crop-sick", but the arrangement of the cropping would be improved if the rotation were altered to (1) bare fallow, (2) wheat, (3) barley, (4) bare fallow, (5) wheat, and (6) oats for grazing. If, however, it were desired to grow wheat, oats, and barley on a farm in this district, it would be a good deal better to lengthen the rotation to (1) bare fallow, (2) wheat, (3) barley, (4) pasture, (5) bare fallow, (6) wheat, (7) oats, (8) pasture, and such a system can be successfully followed for a long time, provided plenty of super be used with the crops, say 2cwts. per acre with wheat and at least 1cwt. per acre with barley and oats, and a leguminous plant such as King Island Melilot or Burr Medic be seeded each season in the stubble of the barley and oat crops to provide abundance of feed and to "tone-up" the soil.

Cropping the Wolseley Soils under the System of (1) Bare Fallow, (2) Wheat, (3) Bare Fallow, (4) Wheat, would eventually lead to "Wheat Sickness", so what would be a Safe Cropping Rotation to Follow?

The safest economic system of cropping which could be followed at present prices for primary products would be the three course rotation of (1) bare fallow, (2) wheat, (3) pasture, provided plenty of super be used with the wheat crop. The soil would have its fertility increased under this system if 2cwts. of super per acre be used with each wheat crop, and the farm returns would be high if fat lambs were produced on the strong pastures which would follow the crops. If more than one crop in three years is desired, the rotation could be lengthened to that of (1) bare fallow, (2) wheat, (3) oats or barley, (4) pasture, but to make certain that the fertility of the land was fully maintained, it would be better to practice a cropping system of (1) bare fallow, (2) wheat, (3) barley or oats, (4) pasture, (5) pasture; or another one of (1) bare fallow, (2) wheat, (3) pasture, (4) barley, (5) pasture; each of the latter two systems giving two crops in five years and two fields of pasture for sheep.

Would a Spring Tooth Cultivator or Combine be as satisfactory as a Plough or Scarifier to Work Land which has only carried one crop?

Whether recently cleared or after having been cropped for a long time, land of light texture, such as sandy soils, and those very rich in lime, can often be worked with a scarifier or rigid-tine cultivator to better advantage than if a plough is used, but where very heavy-textured soils are concerned, the Mouldboard Plough generally gives better results. The reason for varying the type of implement used for the breaking of land prior to cropping is that heavy-textured soils are benefited by turning surface organic matter under the furrow, whereas with light-textured soils the residue of plants should be left on the surface of the soil rather than it being covered over. Spring-tine implements cannot do the job as satisfactorily as do rigid-tine cultivators, because in anything but very loose soils the work is done irregularly, due to the tines straightening out when hard patches are met and jumping forward to their full depth as soon as the implement reaches the looser patches.

Is it a Fact that Wheat Slightly Bleached is Improved for Bread-Making, rather than being Injuriously Affected?

It is quite impossible to lay down hard and fast rules as to what will be the effect of bleaching on the bread-making qualities of wheat, because it varies so much with the weather conditions obtaining at the time of the bleaching, and also with the variety, and so it is necessary to test every sample before being able to express definitely an opinion. In the bleaching which took place in so many parts of the State this year, a great number of samples investigated were improved, insofar as their bread-making qualities were concerned, but both the percentage of flour and the value as a foodstuff as measured by the protein content, were lowered. Several varieties of wheat, of which some was harvested before the heavy grain-bleaching rains, and some afterwards, were tested for flour and bread by Mr. A. J. Farquhar of the Department of Chemistry, who summarised the results secured as follows:—The bushel weight was decreased; the yield of flour and the protein content was lower; the flour colour and the water-absorption power was little affected; the power to rise was increased to a beneficial extent in most samples; the loaf volume and texture was in most cases improved.

What Effect does a Barley Crop have on the following year's seed when the land is left out for grazing?

Barley is easily the best weed choker of all the cereals, and because of this there is never such a free seeding of the edible weeds such as Burr Medic, Barley Grass, Cape Dandelion, &c., in a barley crop as with the other cereals. This reduction in the seeding practically always means that pasture growth is much more scanty after barley than after wheat, oats or rye, unless there has been a heavy shedding of grain before or during harvesting operations. Because of this, it is generally wise to feed down the barley stubble fairly hard, then drill in oats or a mixture of oats and rye in the autumn with some super, and in the Tatiara district it would be advantageous to add also about 2lbs. of King Island Melilot seed per acre with the cereals being sown for grazing.

[Replies to questions from other branches.]

Bleached Wheat for Seed—Should it be Pickled?

The Secretary of the Wudinna Branch of the Agricultural Bureau asked:—"Is it necessary to pickle seed wheat taken from bleached crops which were originally free from bunt?"

Reply.—If the bleaching of wheat ensured freedom from "bunt" in the crop resulting from such wheat, the control of this disease would be a very simple matter. It is true that sometimes the wetting and drying of wheat not very badly infected with "bunt" leads to the killing of the spores on the grain, but this is not necessarily so, and because of the possibility that the disease may appear in the crop, the risk is not worth taking.

Badly bleached wheat is much more liable to be injured in harvesting than is unbleached grain, and as seed wheat with broken outside skins might be injuriously affected if wet pickles are used, all bleached seed should be treated with copper carbonate or a mercurial powder pickle before seeding.

"Capco" Agricultural Lime.

"Rendelsham" asks:—"Would 'Capco' carbonate of lime be of any value for market gardening in the peat soils of the Rendelsham district?"

Reply.—I believe the "Capco" Carbonate of Lime to be secured at or near Port MacDonnell, but do not know whether it is derived from shells or other forms of calcium carbonate. If the material is *not* composed of sea shells, which consist in the main of carbonate of lime, as do marble, limestone, chalk, &c., it should prove useful on your peat soils for market gardening purposes, and at the price of 26s. a ton on trucks Rendelsham, might prove an economic proposition for vegetable growing. It would be necessary to apply it at a rate of not less than 1 ton per acre. If it consists of sea shells, I would not recommend it at that price.

From an economic or any other point of view, carbonate of lime cannot be compared to superphosphate. The carbonate of lime is a soil improver and is not of very great importance as a supplier of plant food, whereas superphosphate is a fertiliser supplying phosphorus, of which our soils are so very deficient and cannot be done without where annual crops are being grown.

If it is a matter of using any form of carbonate of lime instead of superphosphate, I would suggest that the carbonate of lime be left out of the consideration, and all money available for fertiliser be used to purchase superphosphate.

Activities of Women's Branches

ALAWOONA.

At the meeting held on February 16 Mrs. Cooper read a paper "Curing Beef and Pork," and Mrs. Wright spoke on "Drying Plums." Mrs. Balnaves won the competition for the best hint for using lemons. (Secretary, Mrs. Cooper.)

AUBURN.

Sixteen members attended the February meeting. Mrs. Schmerl read the following paper and exhibited patterns to demonstrate her remarks. Other members gave dressmaking hints.

Patterns.

Before cutting out the material from a pattern carefully place the pattern against the figure to see if any alteration is required. You may be longer or shorter waisted, or it may need other alterations and adjustments elsewhere. When satisfied the pattern is a reasonably good fit, proceed with cutting out, not forgetting to allow for seams where they are required. Place the pattern on the material, thus making sure that there is sufficient material to make the required garment. Care must also be taken to cut all parts of the pattern running the same way; for very often materials have two different sheens which are very noticeable and annoying when the garment is ready to wear and thus spoil a good effect. This applies mostly to plain materials. When cutting striped material be particularly careful in placing the pattern so that the stripes match. There is always the danger where the material is cut on the bias that the stripes meet at a brad-angle, which gives a very broadening effect. Try to keep it on as straight a line as possible.

Flat seams are superior to any other seams. They can be made tidy, either by snipping them finely, or another method is to bind seams each side with a fine net, which can be procured for the purpose in various colours to tone in with the frock, giving it a very neat finish. When making a frock always have a hot iron in readiness to press and flatten any parts that need pressing. Not only will it aid in the sewing, but very little pressing will be needed when the garment is finished.

Mrs. Schmerl made the following awards in the pickles competition:—Mustard pickle: 1st, Miss Maddern; 2nd, Mrs. B. Stephens. Mixed pickle: 1st, Miss Dennison (secretary); 2nd, Mrs. B. Stephens. Miss Dennison won 1st prize and Mrs. Allen 2nd prize for the apricot jam competition, which was judged by Mesdames Garrett and Stephens at the January meeting.

BALHANNAH.

Interesting papers, "Laundry Work—Past and Present," were contributed by Mrs. Cox and Miss Warland at the January meeting. On February 16 Mr. Hampel, station master, addressed members on first aid. (Secretary, Mrs. W. Grow).

BALUMBAH.

Members met at the residence of Mrs. W. Riches for the February meeting, when a novel paper and a mock broadcast of the women's morning radio session was read by Mrs. Ellis. A gramophone was used for the musical items which were interspersed with the items discussed. (Secretary, Miss H. Jericho.)

BEETALOO VALLEY.

Home Remedies.

Mrs. Klingner of the Narridy Branch read the following paper at the February meeting:—For Constipation.—Eat 2 or 3 dried prunes each morning. For Colds.—Add 1 tbspn. of olive oil to each meal; on salads, soups, or even with a breakfast cereal. Keep active, exercise, and breathe deeply. Hot baths and oil rubs work wonders. Headache.—Drink ½ tspn. of grated nutmeg in a little hot water. If possible have a quick hot bath and a bowel movement. A Winter Tonic.—Simmer 1 tspn. of flaxseed in 1 pint of water by the side of low fire for 20 minutes. Strain and add the juice of a lemon and sweeten with honey to taste. Take a cupful the last thing at night for 9 nights. To Remove Phlegm.—1 dspn. of finely chopped prunes and another of ground peanuts eaten before breakfast clears the membranes. Try it for a week. Rheumatism.—Oil the body every night. Rub in all the oil the hands can carry until the skin glows healthily and is not oily. Rub always toward the heart with circular movements. Petroleum scented with rose water is the best. Do it in a warm room. Leave coffee alone. Onions "build you up physically and let you down socially, but not if you use parsley with them." Onions are a fine tonic and should be used frequently—stewed, fried or baked. Try them this way: Grate them with an equal quantity of apple and bake with butter in the oven. Excellent for kidneys and nerves. Onions can also be grated with oranges.

Exhaustion.—To 1 tbspn. each of lemon juice and olive oil, add sufficient hot water to make ½ cup of liquid. Beat well and drink slowly. Liver Tonic.—Horseradish freshly grated and brought to the boil in milk, thickened with a little flour and served on toast. If an attack of influenza is threatening take a hot bath and an oil rub. Retire to a warmed bed. Drink the juice of a sweet grape fruit or a lemon. Oil Baths.—Gentle body smearing with the hands keeps the skin active and prevents chapped sore flesh. Use olive oil or almond oil 3 times a week. Chest first, then neck and upper arms, then the legs, feet, shoulders, back, thighs, and finish with the abdomen. Makes for suppleness and resistance to winter ills.

The carrot is coming into high repute. It is rich in vitamin A, for which cod and halibut oil are so famous and for which butter and greenstuffs are renowned.

Milk *versus* Meat.—The need of a sufficient and cheap supply of milk is of paramount importance. It appears, however, to be hardly recognised that milk at its present price is the cheapest food on the market. A pint of milk weighs a little over 1 lb. and costs 3½d. A pint is equivalent in food value to 1lb. of good meat for which we pay 10d. or 1s. In the face of over-production or under-consumption, the only way to remove the existing trouble in the milk trade is to make the public milk-minded. An increased demand would lessen the cost of distribution. It costs very little more to handle a quart of milk than half a pint.

BOOR'S PLAINS.

On February 3 at Mrs. S. Chynoweth's homestead the following papers were read and discussed:—"Summer Drinks," Miss L. Stanway (Secretary), and "Psychology," Miss B. Chynoweth.

COONAWARRA.

Junior members conducted the proceedings of the meeting held on February 16. Mrs. Reschke displayed soap samples and gave the following recipe:—6½lbs. fat, 1lb. caustic soda, ½ cup each lux and borax, 2galls. water. Boil together for 1 hour. Two young members, Misses I. Clayfield and D. Stafford, read papers, "Pressing Trousers" and "A Trip to Queensland." (Secretary, Miss O. Lean.)

ECHUNGA.

Miss Nott and Mrs. Jarman, of Myers Emporium, attended the March meeting, and spoke on "Cyclax Products" and "Country Shopping." (Secretary, Mrs. F. Dennis.)

KOOLUNGA.

Twenty members were present at the February meeting, when the following papers were read and discussed:—"Work Interpreted," Mrs. Whitehorn; "Honesty is the Best Policy," Mesdames Jones and Manners; and "The Child," Miss Pengilly.

KYBYBOLITE.

Mrs. McLeod gave a demonstration of quilting, reed tex, raffia, and macrame work at the meeting held on February 15. (Secretary, Miss M. Moore.)

LAURA BAY.

Rice and Its Uses.

The sponge sandwich competition held at the February meeting resulted as follows:—1st, Miss L. Blunson; 2nd, Miss Doecke; and 3rd, Miss R. Blunson (Secretary).

The Secretary read the following paper:—Rice is one of the most widely cultivated cereals, forming the principal food of nearly half of the human race. It is probably native to India, but is now cultivated wherever there is sufficient heat and moisture. There is proof of rice culture in the Euphrates valley and in Syria 400 years before Christ. Rice constitutes one of the most important articles of food in all tropical and sub-tropical countries, and is one of the most prolific of all crops.

There is only 7 per cent. of gluten in rice compared with 22 per cent. in finest wheat. Rice, therefore, requires to be combined with milk or meat gravy to satisfy the requirements of the system. A large proportion of rice brought to Europe is used for starch making and by distillers for alcohol. In India a drinking spirit known as arrack and the national beverage of Japan, "sake," are prepared from the grain of rice. Rice has been grown in Australia for some years.

The first essential to having properly cooked rice is to wash it well in three or four changes of cold water or until water pours off clear. Rice instead of vegetables.—Boil rice until soft, place in a frying pan (slow fire), add a little butter, pepper and salt; served in this way with roast meat or poultry is delicions.

Savoury Rice.—½lb. rice, 4 tomatoes, 2 tbspns. cheese, ½oz. butter, salt cayenne pepper. Wash rice, put into boiling salted water and cook until tender. Strain and let it stand until dry. Bake tomatoes until tender and remove skins. Put butter in a pan, add tomatoes, cheese, cayenne pepper, and rice, and heat thoroughly.

Rice Salad.—2 cupsful cold boiled rice, 2 chopped hard-boiled eggs, salad dressing, lettuce leaves, sliced beetroot, salt. Mix rice well with dressing and chopped eggs; arrange on crisp lettuce leaves and garnish with sliced egg and beetroot.

Curried Tomato with Rice.—Large solid tomatoes, boiled rice, curry powder, salt. Cut a slice from the stem end of the tomatoes and scoop out some of the pulp. Fill the space with a mixture of boiled rice, tomato pulp, and a little curry powder (½ tspn. to a cup of rice). Replace the cut off slices and bake 15 minutes.

Apricots and Rice.—Boiled rice, cooked apricots, cornflour, preserved cherries, angelica. Cook apricots and thicken syrup with a little cornflour. Pile in the middle of dish and border with cold rice and ornament with chopped cherries and sliced angelica.

Glorified Rice.—1pkt. lemon fruit jelly crystal, ½pt. each boiling water, pineapple or other fruit juice, 2 cups boiled rice, 1 cup whipped cream, 4 tbspns. sugar, salt. Dissolve jelly crystals in ½pt. of boiling water, add fruit juice; when cold, whip to the consistency of cream; fold the boiled rice into the whipped jelly, add 1 cup whipped cream, sugar and salt to taste; chill thoroughly.

Apple and Rice Dumplings.—½lb. rice, 4 apples, salt, sugar, sauce or fruit juice. Wash rice, boil quickly for ¼hr., drain. Peel, core and quarter the apples, spread rice on centre of a pudding cloth, heap apples on top of rice; gather up cloth; make sure apples are covered with rice. Tie tightly and plunge into saucepan of boiling water, boil 1hr. Serve with sugar, fruit juice or sauce.

Peggy's Delight.—1qt. milk, 1 teacup rice, sugar, 3 eggs, essence of lemon, salt, apples. Simmer rice until all milk is absorbed, add tbspn. sugar, yolks of eggs and essence of lemon. Pile on a dish and border with stewed apples. Make a meringue with the whites of eggs, spread over the whole; dust with castor sugar; brown in a slow oven.

Walnut Rice Crunchies.—Cream 6ozs. butter and 6ozs. sugar, add 1 beaten egg, 1½ cups self-raising flour and puffed rice, 1 tbspn. chopped walnuts. Flavour with essence of almonds. Roll into small balls and put on a cold slide. Bake 15min. in moderate oven.

Rosy Rice.—1pkt. red jelly crystals, ½ cup of rice, 2 tbspns. sugar. Cook rice, turn into colander, rinse well with cold water and leave to drain. Make the jelly, adding sugar, and pour over rice, using mould or glass dish. Leave until set. Serve with cream or thin custard.

Rice Pudding (cooked in a billy).—A good rice pudding can be boiled. Put 2 cups of rice in a billy, with 5 cups of milk, 2 dspns. custard powder, and ½ cup sugar. Stir well; put billy in saucepan of boiling water and boil 1hr. or a little longer. It needs no stirring and never burns. The rice can also be cooked in the same way without custard powder, or it can have raisins or dates. It can also be baked.

Miss Doecke spoke on "Lemons."

LONGWOOD.

The opening of a Women's Branch of the Agricultural Bureau by Mr. F. C. Richards (Assistant Secretary of the Agricultural Bureau) at Longwood on 28th March brings the number of Women's Branches up to 67 with 1,653 members. The Longwood Branch enrolled 18 members at its first meeting, and elected the following members to the executive offices of the Branch:—President, Mrs. A. W. Cameron; Vice President, Mrs. W. Hughes; Secretary and Treasurer, Miss M. Porteous; members of the Committee in addition to the 3 officers elected will be Mesdames D. G. Work and W. E. Marks. Future meetings of the Branch will be held on the third Wednesday in each month.

MALTEE.

Arranging of Flowers and Fruit.

The ginger beer competition held at the February meeting was won by Miss N. Schwarz, the Secretary (Miss L. Schwarz) being awarded second prize.

Miss R. Talbot read the following paper:—Flowers and fruit play a great part in the interior decoration of our homes, and the majority of us endeavour to have a garden to supply the home with flowers. In some instances, however, where there is a scarcity of water it is almost impossible to have a garden, but there is no necessity to be without flowers. Realistic artificial flowers can be bought in almost any shade and variety, and with care last quite a long time, and when effectively arranged with real or artificial ferns look almost as nice as the real blooms. Too often, however, with either fresh or artificial flowers, their full value of beauty is not obtained through being unsuitably arranged and with the careless blending of shades.

Always pick flowers in the early morning, and remember to pick a number of buds. Too many people pick only the full blooms, which only last a day or so before withering. The mixture of buds and fully opened flowers is, of course, far more beautiful than the latter. Remember to burn the stems of Gerberas and Iceland Poppies, and Poinsetta stems should be dipped in boiling water. Change water daily, and an aspro placed in the water will often revive drooping flowers. In the arrangement of flowers receptacles vary greatly. Jugs are perhaps the greatest standby for holding flowers, but even these vary in shapes, sizes and colourings. The brightly coloured pottery jug is ideal filled with old fashioned flowers, such as Larkspurs, Dianthus, or Pelargoniums. Plain white jugs look delightful if used in conjunction with white Chrysanthemums, &c. Pewter and brown pottery jugs are beautiful brimming over with Bronze Chrysanthemums, Marigolds, or Gaillardias.

Vases are, of course, the most used of all receptacles. Tall vases should be used for Gladiola, Dahlias, Gerberas, Antirrhinums. etc.; in fact, most flowers with long stems. Squat vases should be used for Roses, Sweet Peas, &c. Pansies give the best results placed in a rose-bowl. In using coloured glassware, extreme care must be taken to see that the shade of the flowers harmonises with the vase colourings. Flat bowls are mostly used for short-stemmed flowers. In fact, Pansies with the stems removed and allowed to float in a china bowl of a purple shade look delightful. Heads of Roses, preferably white, pink, or crimson, arranged in a flat glass bowl, is an ideal centre-piece for a dining table. Orange Nasturtiums with a few leaves also placed in a flat oblong bowl make a charming centre-piece for a dining table.

Never use tall vases of flowers for decorating a dining table if possible. Persons sitting opposite each other at the table cannot converse properly owing to the intervening flowers. If possible use flat or oblong bowls which harmonise with the dinner service being used. Vases wide at the top and bottom and narrow in centre are ideal for arranging long-stemmed flowers.

When using fruit as a decoration always polish apples, &c. Pineapples placed in the centre of the dish is a convenient basis for a fruit dish, and the other fruit can be easily grouped around it. Baskets can be used effectively, and look especially nice filled with oranges and leaves. Always remember that when portion of the fruit has been eaten to re-arrange the fruit which remains, otherwise the fruit arrangement loses its beauty.

McLAREN FLAT.

Mrs. F. B. Wilson continued her Overseas Travel Talk at the February meeting. Miss G. Elliott, who judged the Butter Sponge Competition, made the following awards:—1st, Mrs. W. Rau; 2nd, Mrs. Dyer; 3rd, Miss E. Foggo. (Secretary, Mrs. S. Elliott.)

MILLICENT.

On 18th February Mrs. Lomman gave a demonstration of Rug Making. Cake recipes were read by Miss D. Towers and Mrs. L. Redman (Secretary).

MONARTO SOUTH.

Seventeen members were present at the January meeting and 6 short papers on Laundry Work were read and discussed.

Miss E. Campbell of the Education Department addressed a meeting on 21st January, the subject being "Upholstering."

Making the Best Use of Sheep for the Farm Meat Supply.

The following paper was read by Mrs. T. Bretag at the February meeting:—On most farms sheep provide the main meat supply, and unless one can vary the cooking, the family will get tired of mutton every day. Some housewives serve the mutton generally as a roast with chops sometimes as a change. There is a variety of ways of cooking this meat which can be made into a tasty meal besides making the most of the meat supply. Even when the farmer is his own butcher, the sheep means money.

The following are some of the methods of cooking I adopt to use up the whole of the sheep, whilst giving the family a variety of meat dishes. The leg, shoulder, and loin are usually roasted in the oven, or roasted in a boiler on the stove. If the mutton is roasted, the potatoes are usually baked under the joint. The bone in a leg or shoulder may be removed, and the cavity filled with seasoning. This is very nice eaten cold, and makes a nice Sunday dinner. The leg or shoulder may be boiled with carrots or parsnips and served with either parsley or onion sauces. The meat from the neck and breast may be put through a mincer, add a little soaked bread, salt, pepper, and thyme and sausage meat will be provided for breakfast or rolls. For a small family, mince one half for sausage meat, and the rest will make stew, curry, meat or sea pie. The bones should be boiled to form stock for soups. The breast of mutton may be spread with seasoning, rolled and tied, then boiled or baked; it is best eaten cold. The meat from the neck makes nice Cornish pasties or small meat pies. The breast of mutton and knuckle end of leg or shoulder with the two kidneys will make a very nice meat pudding or pie. Allow the pudding plenty of time to cook so that the meat will be tender. The knuckle ends of a shoulder and leg and the meat from the head and tongue will make potted meat.

The head is often thrown away, but properly prepared it makes one or more nourishing meals. The head must be chopped or sawn in two; remove the eyes, tongue, and brains, then soak in salt and water for some hours. The head should be put in cold water and boiled or simmered until the meat will leave the bones. There are several ways of serving. To make soup:—Remove the head, strain, and allow to cool so that any fat may be removed, return to saucepan, add any vegetables and add the meat.

There are several ways of cooking liver; usually it is fried with rashers of bacon for breakfast. This is a favourite dish. Cut the liver into slices and place in a baking dish or casserole with rashers of bacon, then a thick layer of sliced onions, add pepper, salt, and a good dusting of flour, and nearly cover with water. Place in a hot oven and cook until tender. If a casserole is used, it may be left in the oven for the whole of the afternoon, and the long, slow cooking is an improvement.

Another way is to mince the liver, bacon, and onion, put into pie dish, adding a little salt, sage, and pepper. Sprinkle the top with bread crumbs and dot with butter. Cook in a moderate oven for 1 hour. This is often called mock goose. The heart should be stuffed with seasoning and roasted, and the kidneys roasted or cut in halves and fried.

Try some different ways of cooking chops; for haricot chops take neck chops (as these are not so fat), chop in half and fry brown on both sides. Place in a saucepan. Peel and chop 1 onion, carrot, and turnip, and fry until brown. Add pepper and salt and enough flour to thicken, then add about 1 pint of water. Stir well and pour over the chops. Allow to stew for 1½ hours. Curried chops are also nice; these are cooked the same as the former recipe, only using an apple instead of carrot and turnip and adding curry powder with flour, pepper, salt, and sultanas. Serve with boiled rice. Chops are also nice cooked in the oven and when partly done pour over them a nice batter.

COLD MEAT.

There are various ways of using up cold mutton left from a previous meal. For this purpose a mincer is a boon to any housekeeper, and should be in every farm home. A very little cold mutton minced with some onion and mixed with bread crumbs (or soaked stale bread), an egg to bind, will form rissoles for tea or breakfast, or the mince may be heated and served up on toast. The remains of a cold leg of mutton makes nice curry, which will be appreciated in cold weather.

A hash is another method of using up the remains of a leg of mutton. A casserole is nice for this, as the slow cooking in the oven does not make the meat tough. A hash or stew should never be boiled only simmered.

Potato or Shepherd's pie is always a favourite and is easily made from the left-overs of mutton. Mince some cold mutton, mix with it some chopped parsley and onion, pepper, salt, and a little flour and stock to moisten. Put into a pie dish and cover with a thick layer of mashed potatoes. Brush over with beaten egg or milk and cook in the oven until it is thoroughly heated a nice brown, garnish with parsley.

In summer it is advisable to put part of the sheep into pickle, as the mutton will not keep fresh in hot weather. Corned mutton is very nice served with cucumber, lettuce or any other salad.

SOAP RECIPE.

The caul fat, suet, and any other scraps of fat or dripping should be rendered and put aside for soap. Soap is quite simple to make at home. Put into copper or tin 6lbs. fat, 1lb. caustic soda, 1lb. resin, ½lb. borax, 2galls. water and ¼ cup kerosene. I usually take double the quantity.

The skin of the sheep may also be used at home. Tanned or "cured" it will make a very nice mat, and odd pieces can be used to make polishers for floors, furniture, or boots.

In this way very little of this valuable animal is wasted, most of it being used up on the farm, with a small amount of labour and very little expense. (Secretary, Mrs. F. W. Liebelt.)

MYPONGA.

Members held the January meeting at Mrs. M. Hunt's residence and a paper, "Jams and Preserves", was read by the Secretary, Mrs. M. Bounds.

SPONGE CAKES.

Miss A. Hunt read the following paper:—The temperature of the oven is mostly the cause of failures in cakes. It is best to have a fairly hot oven at first then let it go down to the required temperature. If a cake is put into a slow oven, then heated up quickly, it is inclined to be heavy. Sponge cakes should be cooked in a moderate oven. If the oven is too hot they will rise and then fall or if it is not hot enough they will be uncooked and sticky on top.

HINKLER SPONGE.

The sponge cake will be a better cake if a double egg beater is used; it makes the mixture thicker and lighter. Divide egg whites from yolks and beat until stiff, then add sugar and beat until dissolved, stir in yolks and beat for another 5 minutes, lastly add flour stirring as little as possible.

If butter is used for greasing the tins the cakes are hard to remove from the tins. Greasing them with oil is quite good. If the oven is opened before a quarter of an hour the cake will go down, or if it is cooked too long it will shrink away from the sides of the tin and also fall a little. From ¼ hour to 20 minutes is the right time for cooking. Recipe: 4 eggs, ¾ cup sugar, ½ cup cornflour, 2 tspns. each plain flour (heaped) and cream of tartar, 1 tspn. carb. soda (level spoons), essence and pinch of salt.

MUNDALLA.

Members of the Mundalla Branch held a special session on the afternoon of the Conference of Men's Branches in the Upper South-East at Mundalla on 23rd March. Mrs. W. Golding presided and Mrs. M. L. Jones acted as the Secretary.

Mrs. W. L. Redman and Miss O. Lean, both of Coonawarra, forwarded papers on "Casserole Cooking" and "Savouries" respectively, and Miss E. Campbell of the Education Department gave a demonstration of dressmaking.

In the evening members attended an address by Mr. Spafford on "A Tour of the Southern Hemisphere."

NARRIDY.

Seventeen members were present at the February meeting. A paper, "Duties of the Hostess", was read by Mrs. A. Freeman. (Secretary, Miss G. L. Roberts.)

O'LOUGHLIN.

HOUSEHOLD HINTS.

On 17th February members met at Mrs. C. Kloeden's homestead. The following household hints were given:—To sweeten dripping that has become stale, melt it and when it is boiling, drop into it a few slices of raw potato. Allow them to brown, remove, and the dripping can be used for cooking. Water left in kettles over night and boiled again will not make a good cup of tea. Fill them with fresh water when lighting the fire in the morning. To get rid of ants, mix together borax and honey and smear along their trails, and also sprinkle some dry borax around places which they frequent. When cutting up rhubarb, use a stainless knife, this will prevent the juice from staining the hands. When making sponges or light cake, grease tins, and then sprinkle lightly with cornflour, the cakes will come away evenly. If the soles of new shoes are treated with best copal varnish, they will wear much longer. An excellent remedy for sprains is to boil wormwood in vinegar and apply it hot to the injured part. Before scraping new potatoes, allow them to stand for 5 minutes in warm water in which a small lump of soda has been dissolved. To prevent holes in a cake, add the juice of half a lemon. To soften the hands, rub them with dry sugar for several minutes.

RENDELSHAM.

Twelve members attended the meeting held on 2nd February, which took the form of a Question Box. (Secretary, Mrs. Z. Bignell.)

SHEOAK LOG.

GARDENING HINTS.

The following hints were given by members in reply to questions that had been placed in the Question Box at the January meeting.

What spray is recommended for a pot plant fern infested with insects? Ans.—Blackleaf 40, tobacco dust, or wash with soapy water. Which is the better method of keeping cut flowers; in the same water or changing it? Ans.—Change the water every day. The best way to keep hydrangeas inside? Ans.—(1) Cut at night or in the early morning, scrape the bark from the stems, split the ends and allow to stand in boiling water for a few minutes; (2) Put a penny or halfpenny in the water; (3) Put sulphuric acid in the water. When is the right time to plant carrot seeds? Ans.—Plant in August. How to keep ants away from carrots? Ans.—Make a bait of borax and honey. How aften and when should liquid manure be applied? Ans.—Apply one a week, very light when the ground is wet. Should a lawn be dressed every year and what with? Ans.—Top dress with sand in winter. The best time to cut roses? Ans.—June. The right time to plant gladioli? Ans.—All the year round, 6 weeks after lifting dip in methylated spirit. The correct way to dry beans? Ans.—Cut up and put on a tray to dry in the sun; store in a muslin or cheesecloth bag in a dry place. What is the best way to strike fuschia cuttings? Ans.—In a glass of water or in sand

Forty-two members were present at the February meeting. Mrs. Horsnell read a paper on "Nursing."

SMITHVILLE.

A very pleasant evening was spent in the Smithville Hall on 12th August in the form of a Birthday Party, it being a year since the Women's Branch of the Bureau was inaugurated. The programme consisted of dancing, bridge, games, competitions, musical and elocutionary items. Visitors were present from Lameroo, Wilkawatt, Kulkami and Mulpata. A three-tier Birthday Cake was made and decorated by Mrs. K Day (a member of the Bureau). Musical items were contributed by Mrs. F. May, Messrs. J. Lush, and W. Small, and Misses Carol Young and Evelyn Sumsion of Wilkawatt pleased with their elocutionary items. Mrs. S. Pillar was accompaniste and supplied music for the dance, assisted by Master Colin Day (piano) and Mr. W. Small (violin). Mr. W. Melbourne was M.C. A home-made supper was provided by the Bureau ladies and the cake was cut by the President.

On 18th November Mrs. A. L. Billing, a foundation member of the Wilkawatt Branch, read an article from Sarah Trent's "Golden Years".

Mrs. D. Day took charge of the December meeting and gave a millinery talk, and showed how to cut out and make a small girl's straw hat. (Secretary, Mrs. S. G. Pillar.)

TANTANOOLA.

The February meeting was held at the residence of Mrs. Altschwager. Mr. A. L. Warren (District Horticultural Adviser) gave a Rose Budding Demonstration. (Secretary, Mrs. W. Stafford.)

WILLOWIE.

Mrs. Mills presided at the February meeting, which was in charge of the younger members of the Bureau. Miss M. Mountford read a paper, "Literature", and items were rendered by Misses M., F., and R. McCallum, and L. Gum. (Secretary, Mrs. E. Foulis.)

WILMINGTON.

Twenty-two members and 31 visitors attended the meeting held on 10th February, which was conducted by the members of the Morchard Branch, who contributed the following programme:—Overture, Mrs. Forbes; solo, Miss L. Davill; paper by Mrs. McCallum; violin solo, Miss C. McCallum; song, Miss R. Twigden; paper and demonstration, "How to refoot a stocking or Sock." by Mrs. C. Schultz; solo, Mrs. Forbes; and Mrs. L. Twigden gave a competition, which was won by Mrs. Gus. Noll.

Results of competitions:—Best article made not costing more than 1s. 6d. was won by Mrs. Cole, with Mrs. Brown second; and best worked traycloth was also won by Mrs. Cole with Mrs. Northey second.

Annual Exhibition at Karte.

When every member of a small rural district gives whole-hearted support to any function that is organised, it is surprising what success they can achieve by concerted and co-operative effort.

Since coming to the Karte district 3 years ago, Mrs. F. N. Atze was primarily responsible for the holding of the first Agricultural Exhibition at Karte in 1936, and entries have increased from 271 to 403, 12 new classes being included in this year's schedule. This year the hall was not large enough to accommodate all the exhibits, and tarpaulin awnings were erected outside, under which some of the exhibits were staged. To those of us who live in more congenial surroundings, the quality of the produce raised on some of the farms at Karte is little short of marvellous. Mr. R. L. Griffiths of the Department of Agriculture, who with Mr. C. Dewhirst of Pinnaroo judged the Farm Produce section, said the display of vegetables and fruit would not disgrace a country district with better soil and climate conditions than Karte.

This Annual Show and Exhibition is a red letter day for the folk of the Karte district, and everybody joins in making the day a success. A programme of sports is conducted and the Committee expressed its appreciation of the action of the Department of Education in giving the children of the Gumville and Karte schools a holiday so that they could take part in the various events.

Mr. F. C. Richards (Assistant Secretary of the Agricultural Bureau) opened the Exhibition. Mesdames Hawthorne, Young, Langsford (Pinnaroo), Welden, Colwell, and Miss Colwell (Parilla), and Mesdames Thiele, Blacksell, and Simpson (Parilla Well) acted as Judges.

The following were the successful competitors in the various sections:—

Vegetables and Fruit.—Mr. C. H. Atze, Mrs. A. Bierworth, Mrs. F. N. Atze, Miss J. Holmes, Miss G. Fiebig, Mr. D. R. Flavel, Mrs. Gale, Miss F. Bierworth, Mrs. D. Ahrns, Mrs. M. Small, and Mr. D. Freeman.

Preserves, Jams, Pickles, &c.—Mrs. Mattchoss, Mrs. F. Atze, Miss G. Fiebig, Mrs. Ahrns, Miss E. Atze, Mrs. D. Freeman, Mrs. Gum.

Butter and Eggs.—Mrs. D. Flavel, Mrs. D. Ahrns, Mrs. Gale, Mrs. Mattchoss.

Cookery.—Mrs. Ahrns, Miss L. Guthleben, Mrs. Gale, Mrs. D. Freeman, Mrs. Mattchoss, Mrs. A. Bierworth, Miss G. Fiebig, Mrs. F. Gregory, Mrs. H. Trowbridge, Mrs. C. Gum, Mrs. F. Atze, Mrs. D. Flavel.

Flowers.—Mrs. F. N. Atze, Miss G. Fiebig, Mrs. F. Bierworth, Mrs. Gale, Mrs. Trowbridge, Mrs. Mattchoss, Mrs. Gum, Miss E. Atze, Miss J. Holmes, Miss A. Trowbridge.

Fancy Work.—Miss Trowbridge, Misses N. and J. Holmes, Mrs. and Miss Atze, Miss B. Flavel, Miss G. Fiebig, Mrs. Flavel, Miss Guthleben, Miss D. Trowbridge, Mrs. Mattchoss, Mrs. Freeman.

Farm Produce.—Mr. D. Freeman, Mr. C. H. Atze, Mr. E. Huckel, Mr. G. Holmes, Mr. Flavel, Mr. E. Atze, Mr. H. Gould, Mr. G. Atze, Mr. B. Trowbridge.

A Social and Dance was held in the evening.

Special credit is due to Mrs. F. Atze and her assistant, Miss G. Fiebig, for the capable manner in which they organised and conducted the Exhibition.

Casserole Cooking.

[MRS. W. L. REDMAN (Coonawarra).]

Casserole cooking has many advantages. It is simple, interesting and a time saver. Most dishes cooked in this manner are inexpensive, as cheap cuts of meat are just as tasty as the expensive cuts. An earthenware casserole is preferred. Cooking by this method on a busy day is an advantage; the only care necessary is to watch that the fire does not go out and that a moderate oven is retained. The food is prepared 2 or 3 hours before serving. There is no danger of it burning, as may be the case if cooked on top of the stove, or of it being undercooked if the fire goes out. Once the casserole is heated it retains its heat and the food is slowly cooking. Food cooked in this manner is always tender, tasty and nutritious; it is really a steaming process.

Cook steak and onions by this method, and it is not necessary to buy the undercut. Mix 2 tspns. flour, salt and pepper to taste, rub well into the steak, place onions on top, cover with water and cook 2 or 3 hours.

Curry, chops, rabbit, sausages with tomatoes, stews, &c., can also be cooked in the casserole. It is surprising what a variety of dishes can be cooked by this method. Chops are tasty if cooked this way. Rub chops with flour and salt and cook with a little water. Pour this and fat off, add 1 cup or more of milk and parsley. Put back in the oven and when boiling, add 1 tbspn. of cornflour to thicken.

RECIPES.

Casserole of Duck.—Ingredients—Duck, pinch powdered garlic, ½ pint stock, 1oz. butter, ½ tspn each mixed herbs and sage, ¼ pint good cooking sherry, salt and pepper. Cut the duck into joints, melt the butter in the casserole, and fry the joints until golden brown. Shake in the pinch of garlic; add the herbs and seasoning. Heat the stock and sherry until warm, then pour over the duck; cover the lid of the casserole and cook for one hour in a moderate oven. In recipes where the ingredients are fried first and the liquid added before putting the casserole into the oven, it is wise to warm the liquid, as this prolongs the life of the casserole. Remember, also, not to put a hot earthenware utensil on a cold or wet surface, otherwise it may crack.

Stuffed Lamb Casserole.—Ingredients—½ leg of lamb, 2 small onions, 2 parsnips, salt and cayenne pepper, 3ozs. bread crumbs, 1oz. shredded suet, 1 egg, 2ozs. dripping. Remove the bone from the meat. Make the bread crumbs; peel the onions and boil for 20 minutes. Prepare the parsnips, and cut into pieces of medium size. Melt the dripping in the casserole on top of the cooker, and brown the parsnips. Make up the stuffing from the bread crumbs, suet, and chopped boiled onion. Add the salt and a pinch of cayenne pepper. Beat the egg and mix with the other ingredients. Fill the cavity where the bone has been removed; tie the joint around with string, and put in the casserole to brown each side. Turn it over with two wooden spoons and see that the stuffing remains inside the joint. Put the lid on the casserole, and place in a warm oven for 30 minutes. Turn the meat for another 30 minutes, cooking in a slightly cooler oven.

Casserole of Pears.—Ingredients—2lbs. of pears, ½ pint water, green colouring, 6 dstpns. of sugar, 6 cloves, dessicated coconut. Earthenware cookers are especially suitable for fruit, because the acids cannot act upon the earthenware. Peel and quarter the pears; take out the pips and cores. Place the quarters in the casserole with the water, sugar and cloves, and put in a moderate oven for 1 hour. Remove from cooker, add a few drops of green colouring, and scatter dessicated coconut over the surface.

Savoury Tarts.—¼lb. cheese, 1 egg, pastry, ¼lb. bacon, 1 onion, pepper and salt to taste. Make a good short crust and roll out about ¼in. thick. Line small patty tins with pastry and prepare the following mixture: Chop the onion finely and put on to boil. Cook until tender. Drain well and mix with the diced bacon, grated cheese and egg. Fill the patty cases with mixture and bake in moderate oven until golden brown and pastry cooked through. Serve hot for afternoon teas, supper or Sunday night tea.

Salmon Patties.—½ cup chopped salmon, pepper and salt, ½ cup thick white sauce, 1 dstspn. cream. Mix salmon with white sauce, pepper, salt, and cream. Fill pastry patty cases with this mixture. Garnish each patty with a sprig of parsley and 2 capers. Serve hot or cold.

Cold Savouries.—Mix marmite and butter together and spread on plain biscuit; then sprinkle with chopped nuts. Butter plain biscuits and sprinkle with chopped hard boiled eggs and parsley or chopped capers on egg. Decorate with half an olive each end of biscuits. A small patty case filled with celery and mashed cheese, or mushroom and cheese. Butter plain biscuits and sprinkle with chopped pickled walnuts. Fry fingers of bread in butter and serve cold with a slice of tomato and a sardine on each. Spread a mixture of fish or other paste and butter on brown or malt bread, and sprinkle with chopped nuts. Roll each slice and fasten with a toothpick until required.

Bubble Bread.—1 tbspn. each grated cheese and butter, 1 cup flour, small tspn. salt, ¼ tspn. cayenne pepper. Rub butter into flour, &c., and mix to a stiff paste with milk. Roll out like paper.

Savouries.

[Miss O. Lear (Coonawarra).]

So important a place do savouries now occupy in meal planning, that all housewives who are most desirous of pleasing are now making a serious study of them. Even the lightest and creamiest of cakes cannot shake the popularity of savouries for afternoon or evening parties. Tempting savouries are greatly appreciated by the majority of people, and may be served either hot or cold. Introduced as a dinner dish, a savoury is very much relished. Stew is rendered more palatable if savoury balls are dropped in and boiled for half an hour before serving. Small individual Pyrex-ware dishes are used by many hostesses for serving savouries at dinner or supper. Savouries served in such dishes, or small scallops, can be prepared some time previously, placed ready on an oven slide and put in a moderately hot oven about 15 minutes before required. Then each small dish is placed on a plate and covered with a dainty d'oyley for convenience in handling. These scallop dishes are, of course, best served at a small gathering, unless the hostess possesses a very large number of small fire-proof dishes. The dishes must not be too full—all savoury containers should be small and dainty. Savoury dishes must be attractively garnished with decorations that blend well with the flavour of the dish, and a contrast in colour should be made between the dish itself and the garnish.

Capers, olives, gherkins, small strips of beetroot, tomato, celery, shoots, lettuce (small leaves or shredded), stuffed olives, and shrimps are some suggestions for garnishing. Small savoury cases can be made from numerous mixtures, such as cheese, straw, choux pastry, rough puff pastry, short crust, and cheese pastry. Cold savouries are particularly appetising during summer, and in very hot weather they are generally preferred to sweet cakes. Savoury salads at this time of the year greatly assist in overtaking the fugitive appetite of the peckish. In hot weather they are piquant, fresh, wholesome, and easy to make. Not the least important item at a party is the supper, and many a hostess finds the selection of suitable dainties rather a task. One cannot go wrong with savouries; careful cooks and popular hostesses know that delicious flavours which tempt the appetite and delight the taste have a satisfying distinctiveness and richness with which they may win the admiration of guests.

Delicious and quickly prepared savouries can be made with meat pastes, cream cheese, and home-made fish pastes, made up and kept for emergency purposes. Savouries are also served as "the little touches that complete the meal". This relish was originally introduced as a means of destroying any trace of cloying sweetness and so prepared the palate for the proper appreciation of the different wines which accompany dessert. Men especially are fond of savouries, and some consider a dinner quite incomplete without this agreeable relish, which offers such a pleasing variation; they are always served in very small proportions, therefore daintiness is essential. It is essential for a savoury to be piquant; flavour is the main thing. The preparation of savouries is simple, and only care is required to present a dish which is both tempting and appetising.

RECEIPES.

A Savoury Dish.—2lbs. mutton chops, pare off all fat, roll in flour, place in casserole or in a saucepan with a good lid. Mix 1 small tspn. mustard, 1 tbspn. each of flour, tomato sauce and Worcestershire sauce, and a little water, making sufficient liquid to cook meat. Add meat and simmer gently for about 2½ hours.

Savoury Balls.—6ozs. flour, 1 tbspn. each baking powder and chopped parsley, 2ozs. suet, pinch salt, pinch dried herbs. Chop suet finely, add the ingredients, and mix to soft dough with water. Form into balls and cook in stew for 20 to 30 minutes.

Tomato Savoury.—Cut tomatoes into rounds and fry in a little butter. Have ready some small rounds of hot buttered toast or fried bread, put a slice of tomato on each round (they should be about the same size) and cover thickly with grated cheese. Decorate the top with a few capers if liked. Put in oven a few minutes and serve very hot.

A Few Business Suggestions.

In the paper by Mrs. S. L. Bowden, of Sheoak Log on the above subject an error appeared on page 768 of the March issue. The statement "If selling a cow to Mr. Jones, it is entered up and carried forward to the next page, the amount as follows" should read "If buying a cow from Mr. Jones the amount of cash is entered up on the right hand side when the money is paid, as follows:—"

Christmas Turkeys and Asparagus.

Writing from London on 31st December, the Agent-General (Sir Charles McCann) states that no greater proof of the conservative taste of the Englishman could be forthcoming than the fact that for nearly 200 years (practically since the date they were first introduced into this country) turkeys have been a very popular Christmas fare. In the days of the Romans the peacock held pride of place as the bird for ceremonial feasts. Later, geese became very popular, and old records of Lincolnshire, dating from 1790 to 1805, give details of immense goose fairs, at which thousands of birds were sold. Incidentally, there are references, too, to goose depots in Surrey, adjacent to London, where goose-herdsmen shepherded their flocks on the swampy country near Cobham for fattening and regular supply to the English Christmas market. The turkey, however, has since deposed all other poultry birds used on ceremonial occasions.

This week Smithfield and Leadenhall markets are flung from floor to ceiling with English, Irish, Latvian, Austrian, Czechoslovakian, French, Canadian, Argentine, Uruguayan, Australian and Italian birds, either in fresh, frozen, or chilled condition. On the whole, I think, the quality has been better this year than I have seen previously, and the price, ranging from 1s. 8d. to 1s. 3d. per lb., might be termed reasonable, in contrast with past seasons. Much controversy invariably arises each Christmas on the various markets regarding the best and most economic method of trussing a turkey for cooking at home. Having seen many methods demonstrated, I think that the way adopted in the South American restaurants gives greater freedom and increased length of white meat cuts than any method I have seen in other parts of the world. The South American restaurants cut both wing tips at the first wing joint, and twist and bend back, and cross the remaining wing studs underneath the back of the bird, where they are tied. The hind legs are left straight and pushed down as far as possible on each side of the bird, and a skewer put through to keep them in position whilst cooking. This leaves the whole of the body surface clear of wing obstruction, and considerably facilitates carving.

Asparagus.

An interesting feature of Christmas shopping displays was the large amount of Argentine asparagus that was on display, varying in price per bundle from 4s. 6d. to 10s. 6d., according to the price standard of the shopping locality in which it was sold. The asparagus was of good uniform thickness and greenness, nicely graded and in splendid condition, and as it landed at the Christmas season and at a time when the market was absolutely bare of supplies, the values made were abnormal. I see no reason, provided chilled space is available, why Australia should not participate in the Christmas market here. The early shipments some years ago from Argentine had difficulty with mould after the asparagus landed, and was brought in contact with the outer atmospheric temperature, but I think that this was largely due to shipment in moist condition. The asparagus is shipped in wooden cases, open about half way up.

Advisory Board of Agriculture

The monthly meeting of the Advisory Board was held on Friday, March 25, at 2.15 p.m., there being present:—Sir Wallace Sandford (Chairman), Messrs. S. Shepherd (Vice-Chairman), H. N. Wicks, A. M. Dawkins, F. Coleman, S. Williams, P. J. Baily, W. E. Ford, Hon. A. L. McEwin, Prof. A. J. Perkins, Messrs. W. J. Spafford, and H. C. Pritchard (Secretary). An apology was received from Mr. A. J. A. Koch.

New Member.—The Chairman welcomed Mr. S. Williams, who had been appointed a new member of the Board in lieu of Mr. Geo. Jeffrey, who had resigned.

New Members.—Approval was given to the addition of the names of the following persons to the rolls of existing Branches:— Alawoona Women's — Miss Baynes; Balumbah Women's—Miss Joyce M. Aveling; Beetaloo Valley—J. Borthwick, F. Lock; Berri—M. C. Cotton; Boor's Plains Women's—Mrs. W. Kennett; Coonawarra Women's—Mrs. H. W. Redman, Mrs. G. Smith; Currency Creek—Alan Higgins, William Burgar; Georgetown Women's—Miss K. Brown; Goode—K. Schwarz; Jervois—S. C. Carlyle; Kalangadoo Women's—Miss K. Crowe; Kangarilla, Norman Thorpe, T. O. Golder: Karte—H. G. Gould, C. W. Gum; Karte Women's—Miss Muriel Bierwirth, Mrs. C. W. Gum; Keith—C. A. Cook, Alan Taylor; Keyneton—C. Rodgers, E. M. Rodgers, K. Rodgers, A. Kruschel; Kingston—Max Smith, Keith Smith, A. J. Fletcher, Roy Pitt, C. Delongville; Koolunga Women's—Mrs. Haeusler; Lipson—H. W. Nankivell; Milang—C. H. Heading; Millicent—Ronald Campbell; Millicent Women's—Miss M. Mullins, Mrs. T. Bowman, Mrs. V. Kent, Mrs. W. Hart, Mrs. S. McArthur; Mount Compass—G. C. Kay; Narridy—M. O. Smart; O'Loughlin Women's—Miss A. Bergmann, Miss E. Kloeden, Miss U. Kloeden; Penwortham—John Alcock; Pinnaroo Women's—Mrs. C. Lutze; Rendelsham Women's—Mrs. L. Paternoster, Mrs. M. Paternoster; Saddleworth Women's—Mrs. G. L. Plueckhahn; Sandalwood—N. F. Schultz, C. K. Cairns, W. A. R. Cairns, W. B. McKenzie, J. K. Shilton, W. Carpenter, D. W. Bennett, E. R. Masters; Watervale—G. Grace; Yundi—W. Gray, — Richardson.

Life Members.—The following names were added to the roll of Life Members of the Agricultural Bureau:—Messrs. G. P. Symonds (Pygery), E. R. D. Hinze (Penola), C. E. Buck (Shoal Bay), Wm. Tilling (Longwood-, H. Doley (Petina).

Various resolutions of conferences and branches were considered.

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All communications to be addressed:
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A. P. BLESING, *Minister of Agriculture*

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Agricultural Bureau Conferences, 1938

River Murray, at Berri, 16th June (Mr. E. J. R. Johnson).

Eyre's Peninsula (West), at Ceduna, Wednesday, 6th July (Mr. P. S. Morrison, Laura Bay).

Upper North, at Appila, Wednesday, 13th July (Mr. E. H. Wurst, Appila).

Each Conference will commence at 10.30 a.m. Papers and questions for the agenda of any Conference should be submitted about a fortnight before the date on which it will be held.

McLaren Flat Pruning Competitions—Friday 3rd June (Mr. G. R. Roe, McLaren Flat).

Overseas Wheat Quotations

By courtesy of the New South Wales Marketing Bureau, the South Australian Department of Agriculture is supplied regularly with statements showing overseas quotations for wheat to the nearest eighth of a penny. The accompanying table gives weekly quotations in the State or country of origin of the wheat, and months of shipment or delivery.

Date of Quotation.	Values elsewhere than in Sydney are expressed in English Currency.							
	S. Aus. Wheat.	W. Aus. Wheat.	Manitoba No. 3. *	Argentine Wheat.	Karachi Choice White Wheat.	American Hard Winter Wheat. †	White North Pacific Wheat.	Russian.
1938.	April.	April.	May.	April-May.	May-June.	April-May.	April-May.	Afloat.
	s. *d.*	*s.* *d.*	*s.* *d.*	*s.* *d.*	*s.* *d.*	*s.* *d.*	*s.* *d.*	*s.* *d.*
April 13..	4 3	4 3¾	5 6	4 10	4 2⅝	4 6⅜	3 11¼	3 11⅝
							May-June.	
April 21..	4 3	4 4⅝	5 5⅞	4 9⅛	4 2¼	4 6⅝	4 0⅝	4 0¾
April 28..	4 1⅞	4 3⅜	5 1⅞	—	4 1⅞	4 5¼	3 10⅞	—
	May.	May.				May.		
May 5..	4 1½	4 2⅝	5 1½	—	4 0¾	4 4½	4 0¾	—

* *ex* Atlantic ports. † *ex* Gulf Coast.

THE JOURNAL
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Superphosphate—The Leading Factor in Pasture Development

[By L. J. Cook, Experimentalist.]

It is less than 20 years ago that the realisation of the value of fertilisers applied to pasture lands in this State became definitely apparent, and since 1924 the work of top-dressing has advanced at a fast rate.

In earlier years, good "mixed farmers" found that by adding extra superphosphate to their annual cereal crops they received better feed on their fields in following seasons, whilst a few in the heavier rainfall districts used bone-dust and less soluble fertilisers as food for their pasture.

Professor A. J. Perkins had the first definite test of top-dressing set out at Kybybolite Experiment Station in 1919.

In 1924 the Government Statistician commenced collecting figures for the State, and found that 67,124 acres were top-dressed that year with 4,080 tons of superphosphate. By 1930 the area was trebled, 214,539 acres being top-dressed with 115lbs. each on the average.

In 1935, 535,990 acres were top-dressed at the rate of 1cwt. per acre, whilst in 1936, 46,399 tons were used on 903,530 acres, 114lbs. each, so that in 12 years top-dressed land has increased from 67,000 to almost 1,000,000 acres.

The Advantage of Quick Response from Water-soluble Phosphate.

In the earlier trials of top-dressing, much was expected by the use of the less soluble forms of fertilisers, such as bone-dust, basic slag, bone super. and crushed rock phosphate, especially from the latter with its low unit value of phosphate. These gave splendid returns when properly used, but it was quickly learnt that the water soluble form in superphosphate gave the quickest response in the most economical manner. Superphosphate applied in autumn provides a ready supply of soluble phosphate to enable plants to make most of the rainy season, and produce the greatest bulk of growth whilst soil moisture is available.

The Keen Appreciation of Clovers for Superphosphate.

No plants appreciate being fed with superphosphate like clovers. Without doubt they make the most use of it, and in fact absolutely refuse to grow without some phosphate is available. Instance our virgin soils which in many cases contain little more than traces of phosphate naturally. These will produce some grass feed without treatment, but never a bite of clover until phosphatic fertiliser is added to the soil.

Clovers are essential in our pastures to provide the necessary balance of feed, and more than that, to build up the organic supply of the soils to enable good nutritious grass and other plants to thrive. Hence, as clover is necessary to make and maintain fertile soils, and because clover must have ample available phosphate in the soil solution to make its best growth, superphosphate can justly claim to be the leading factor in pasture development.

The Need for Continued and Regular Applications of Superphosphate.

Pasture development is not a quick process, and with soils that are very deficient in both phosphorus and organic nitrogen, a number of seasons are required to bring them to a high state of fertility. Two or three seasons with liberal applications of superphosphate have often to be carried at a loss, but success will come under the right conditions, if top-dressing is continued. It is first necessary to produce a good supply of clover seed over the field, and then to force a heavy dominant growth of clover for several seasons to enrich the soil. Subsequently Nature will exert its balance, grasses will grow better, and with good management and continued superphosphate dressings, a highly productive mixture of grass and clover can be maintained.

After 10 to 12 years of top-dressing, applications of superphosphate still show definitely higher production. Other fertilisers, such as lime, potash or other minor minerals, may become necessary as well, on some of our pastures, but phosphates will always be needed, and successful pasture men realise the value of continued and regular applications of superphosphate.

Rainfall is the Governing Factor of Quantity of Annual Dressings.

In obtaining the limit of production from pasture lands, rainfall will govern the amount of superphosphate to apply annually. When soils have been built to a reasonable fertility, it is recommended that from 100 to 150lbs. of superphosphate per annum can be economically applied on a 15 to 20in. rainfall, and 150 to 250lbs. on a 20 to 25in. rainfall.

Superior Growth of Grass of High Mineral and Protein Content.

Pastures that have been regularly top-dressed with superphosphate produce a superior growth of grass, that is noticeable by its bright rich colour and its palatability to livestock. In its young growing stage, such grass is highly nutritious, being rich in protein and of high mineral content, and in its mature and over ripened stage it still provides a straw and hulms which stock will consume with satisfaction, whilst they will pass over the straw of unfertilised grasses.

Truly, our livestock must bless the advent of superphosphate to their pastures. No need now for them to spend the whole day browsing in a quest to satisfy a deficiency that was not available.

Superphosphate definitely increases the quality of milk, meat, and wool, and increases the production per acre fivefold.

Recreation in Relation to Farm Life.

[D. McKenzie (Warramboo).]

To some this subject may sound of minor importance, but it can and does have considerable bearing on the harmony which should exist between employer and employee or father and son. While not advocating for one minute that work should be neglected in favour of sport, I do not think that any farmer should begrudge his employee a Saturday afternoon free for sport, except during the busy periods of seeding and harvest. By so doing a better feeling would exist between employer and employee. A contented employee will give more satisfaction than one who is more or less slave driven and not allowed any time for pleasure. Even though the employer may not be interested in sport himself, consideration should be given to the employed farm hand. The same principle should apply in the case of father and son. A man with sons should do everything possible to encourage them to take some interest in some form of sport, and in this regard the putting down of a few yards of concrete for a cricket pitch or the laying out of a tennis court is money well spent. This is one way of making farm life more attractive, for during certain periods of the year there is often a chance of making use of few spare minutes on the cricket pitch or tennis court.

Apple Export

[By Officers of the Horticultural Branch of the Department of Agriculture, Adelaide.]

(*Continued from page* 467.)

Picking and Picking Equipment.

Once it has been decided that fruit has ripened sufficiently, the main work of the apple harvest commences. The bulk of export fruit is picked comparatively early in the season, and the exact procedure to be followed varies with the particular grower and the nature of the crop of the particular tree. The fruit upon the one tree is never all of the one stage of maturity, and it is necessary, therefore, to pick over the trees several times to obtain the fullest return; the exact number of pickings will depend on the size of the crop.

Light Crop Trees.

A light crop tree generally carries fruit of poor keeping quality, fruit which is subject to storage diseases that make it totally unsuitable for export. These trees should be allowed to mature their produce sufficiently for the home market, picked, and the fruit either sold immediately, or stored locally for a short period only.

Trees bearing a medium to a heavy crop in general practice are picked over at least two or three times. The best and the most forward fruits are removed first and packed for shipment. The backward fruit is allowed to develop, and is in turn removed, as it comes up to size, and with some varieties, to colour requirement. The most backward fruit, and badly blemished specimens are picked last; the light crop trees are cleared, the saleable fruit marketed, and the culls disposed of. Cull fruit should never be left in the orchard.

Very heavy crop conditions, especially on the later maturing varieties, or possibly, the requirements of a special range of sizes, to fulfil shipping commitments, may require a fourth picking, but this rarely appears to be justified.

Field Grading.

It is essential for the efficient working of the packing shed that pickers send in fruit with only a small proportion of rejects while the export packing is in progress as quality grading in many sheds is largely left in the hands of the packers. If preliminary grading is executed by the pickers as they select the fruit on the tree, a much superior line of fruit comes into the shed, and a more satisfactory grade can be struck for the final pack. Good grading for quality is very difficult without preliminary field grading, and the employment of special grading hands. Fruit unsuitable for export coming in at this time slows up packing, and cannot be handled by the average shed without detriment both to itself, and to overseas consignments. The majority of our co-operative sheds recognise this point, and growers sending to these sheds fruit with more than a certain percentage of rejects, must arrange themselves for the re-sorting. The general adoption of this rule would result in an improvement in the grading of our apple packs, and assist materially in the more expeditious handling of fruit.

Field Sizing.

The picker must be able to size fruit accurately, and to pick to certain definite sizes. Usually, the first pick is to a minimum export size of probably 2¼ins., and often only a certain range of sizes is wanted at the shed at the one time. Any fruit picked outside the required range of size is either wasted, or held in the shed until it can be dealt with—greatly to its detriment. Considerable waste can be prevented by providing the pickers with gauges and more particularly a gauge for the smallest size required. Simple and effective gauges can be easily made by the grower himself, and there are many available on the market.

Picking Bruises.

A freshly picked apple is very liable to bruising injury and pickers must handle fruit carefully, especially during damp weather. One of the most critical periods for the fruit from a bruising standpoint, is that between the actual picking, and its presentation to the packers. To quote—"The operation of picking is of the utmost importance in the marketing of apples. Observations on the markets show that an enormous amount of avoidable damage is done by the rough treatment and the unskilled handling during the picking and handling in the orchard. The effect of damage or bruising at picking time very often only becomes apparent at a later stage." This quotation is taken from an English bulletin, written for growers whose fruit is all sold within their own country. Much of our fruit is sold on the same market, after travelling many times further, and for a much longer period, during which damage sustained at picking has more opportunity to develop.

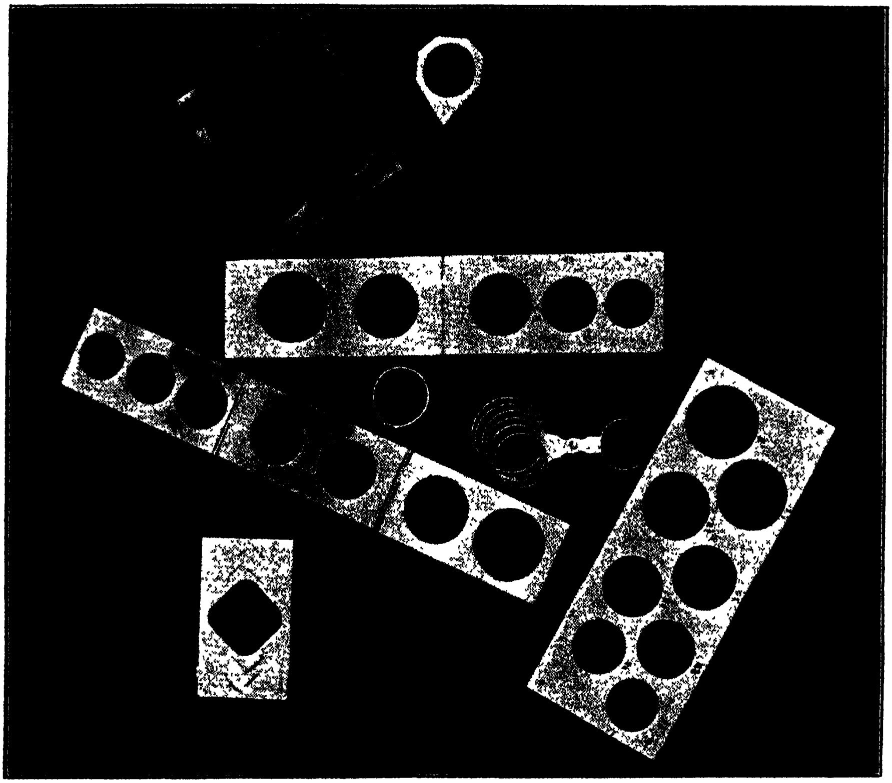


Fig. 1.—Fruit-sizing gauges in common use. Four of these are unsuitable for picker's use. Under most circumstances the single hole gauge of one size only is sufficient for use in the garden.

A carefully handled apple is surprisingly resistant to decay and loss of condition. It is in the neighbourhood of bruises that breakdown commences, and that rot organisms gain entry. Storage in local refrigerated chambers does not indicate the importance of the bruising factor. Apples sent overseas are often longer in reaching the refrigerated chamber, viz., the ship's hold. They are much slower in cooling, and may well be outside Australian waters before they reach the correct storage temperature. The storage life of export fruit, therefore, may be considerably less than fruit picked at the same time, but held in local cold store. Furthermore, it may be a month after arrival at the overseas dockside before exported fruit is opened for sale by the retailer, a month spent in common store, in the warehouse or in transit. It is during this period, when the fruit is fully ripe and often tending towards over-maturity, that the slight bruises, sustained particularly at picking and shortly afterwards, appear as decay areas. This fruit is not sorted out and sold as it ripens, but must stand up to a set period of storage, under conditions by no means ideal. It is to enable resistance to decay at the latter end of this storage period that care of handling during picking and packing is of such importance.

Picking.

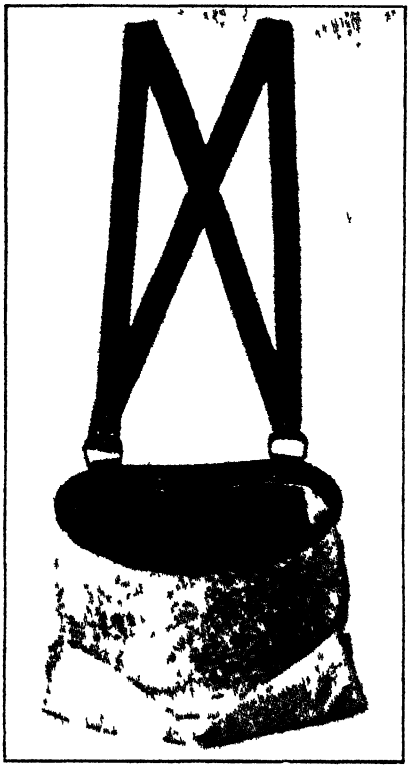
Fruit must be picked, not plucked from the tree, and this is essentially a skilled operation. Each fruit must be grasped in the whole hand, as gripping with the finger-tips will invariably lead to bruising if the fruit stems are at all tough. The fruit should then be lifted upwards and sideways, so that the stem comes away with the apple. Twisting and pulling wrenches out the stem, leaving an unprotected wound, and rendering the fruit unsuitable for export. This point cannot be over-emphasised, for dirt and decay organisms naturally wash down into the stem cavity throughout the season, and a break in the skin in this position is a frequent cause of rotting.

Usually, as the fruit approaches ripeness, the apple stem parts readily from the tree. This is one of the signs of maturity, and is due to the formation of a layer of cork tissue across the line of junction of fruit with spur. In the early picks, however, this corky layer may not have completed its development, and drought particularly may even result in a strengthening of the stem attachment.

Under these conditions, stems must often be actually broken across the finger nail, before the fruit will come away, and, unless care is taken, the spurs bearing the next season's crop will be severely damaged. Even so, there is no excuse for the pulling out of stems, and each picker will develop his own technique as soon as the point is realised and insisted upon.

Picking Equipment.

Most of the South Australian apple crop is picked into picking aprons, and the misuse of aprons probably causes more damage through bruising than any other single factor. Some of our most prominent growers have recognised this, and have reverted to the bucket as a picking container in an attempt to avoid the damage which seems unavoidable with cloth picking aprons and bags.



(From U S Dept Agric Bulletin.)
Fig 2 A metal-sided picking bag with canvas drop bottom

Picking Apron.

The several types of apron in use are convenient, and the fruit can be easily and safely placed into them; almost invariably, however, they are over-filled, and bruising of fruit occurs. The weight of the whole bag of fruit is taken by the few fruits against the picker's body, so that movement of the operator, especially on the *ladder*, and when walking to the case to empty causes further bruising. The apon certainly allows the fruit to be placed into the bottom of the case without dropping, but it must be crowded into the top of the case, before the fruit can be released, and nearly the whole weight is taken by the few fruits resting on the narrow and sharp edges of the case top. It is true, of course, that many of these disadvantages can be overcome by avoiding overfilling, but even so, the apron must be so carefully used that many of its advantages are lost; it is certainly dangerous to, fruit in the hands of the average picker.

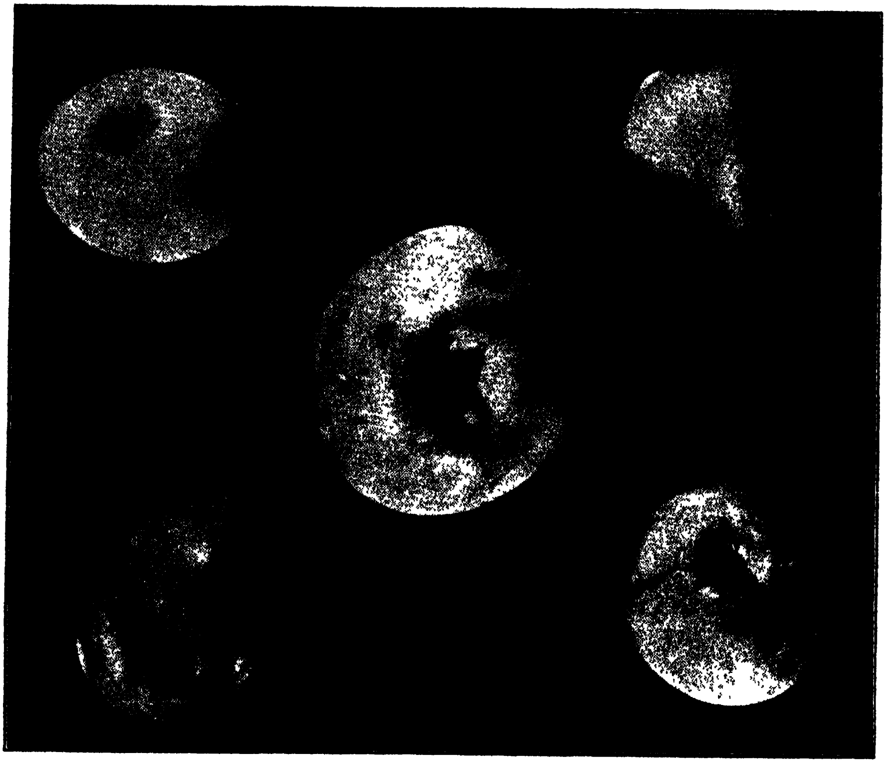


Fig. 3.—Obviously abnormal fruit from a light crop tree, showing Bitter Pit, Split Calyx, Misshapen, and Bullnose.

Picking Bag.

The stiff canvas picking bag, fitted with drop bottom, is probably the best of the picking receptacles in general use at the present time. The material from which these bags are made, however, is not sufficiently rigid to offer any protection against movement during picking and against case bruising, when emptying. Actually, their advantages arise from the fact that they cannot be over-filled so easily, but many are made so large that the fruit may still be bruised by its own weight.

The best type of bag yet encountered is illustrated in Fig. 2; a similar type of bag is in general use in New South Wales. This bag has all the advantages of the apron, but the sides are of light sheet metal, padded at the top and inside. The bag holds about half a bushel of fruit, and cannot readily be over-filled. A canvas drop bottom gives rapid and safe emptying, as the sides are sufficiently narrow to enter the case, and allow the fruit to be placed right on the bottom. The weight is taken by the shoulders and supported well clear of leg movement.

Filling Cases.

Whatever type of bag is used, the fruit must be placed and not dropped into it, and over-filling must be avoided. Careful emptying is essential, and the rattle of apples into the field box is a sound which should not occur. Stacking of field boxes should always be avoided if possible, although on many properties it is certainly necessary if the fruit is to be adequately covered. Field cases should never be quite filled, even if stacking is not contemplated. Field boxes should preferably be taken to the tree. This is not the usual practice, but pickers must avoid as much movement as possible, with a full bag of fruit. As each case is filled, it should be shaded, another placed ready for use, and the bag cleared of stems and twigs before proceeding with picking.

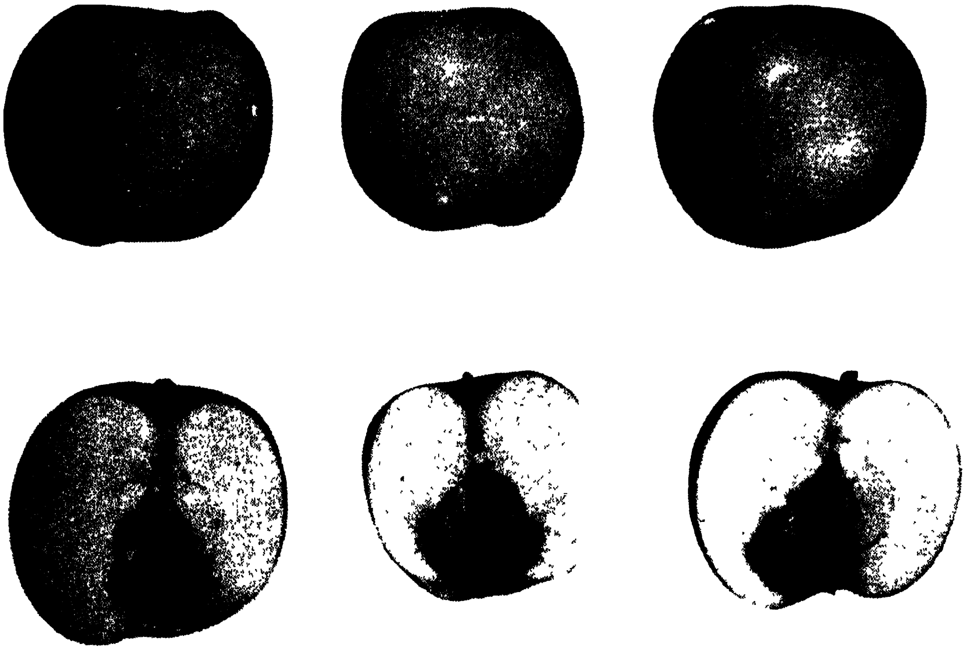


Fig. 4.—Apparently normal fruit from light crop trees, but internally badly affected with mouldy core.

Field Boxes.

The field box most commonly used in South Australia is the "kero" or petrol case, opened on the top. This box is very convenient, and is generally well suited for the carriage of the fruit to the packing point. These boxes are becoming scarce, however, and many growers are obliged to buy other types. Often the dump bushel box is purchased for field use, but this box is not thoroughly satisfactory. It is too narrow, the boards are too widely spaced, and it does not withstand continued use in the orchard. The banana crate which is also fairly commonly used, is open to much the same criticism, for although the shape of this case is good, much damage may be occasioned by the widely spaced boards. Furthermore, the side and bottom of this case are too pliable, so that bruising occurs in the ordinary process of handling and stacking.

A good orchard box must be rigid, with closely set boards, as a gap of as little as a quarter of an inch will often cut the fruit during the movement of carting. It must be smooth, free from projections and sharp edges, and strong enough to stand continual use through several picking seasons.

On no account must new export cases be used in the garden. They are unsuitable as an orchard case, will not stand much handling, and become so dirty that if used for packing export fruit, the appearance of the whole consignment is spoilt, even if the boxes are not disfigured sufficiently to lead to rejection for export.

Orchard boxes should be collected and put into thorough repair before the picking season opens. This work should be put in hand during the winter whilst cases are being dipped for the destruction of sheltering codling moths; once picking is started, the rule should be made that no defective case is taken into the garden. Cleating and wiring the ends of the field boxes is justified, if only from the viewpoint of extending the life of the cases. It is more than worth while when the loss of fruit is reckoned.

Once the fruit is off the tree, it must be remembered that every hour that it remains out of cool storage is reducing its storage life, the life upon which its quality and value in overseas markets depends. It is important, therefore, to accelerate as much as possible the passage of fruit into and through the packing house.

(*To be continued.*)

Talk on Animal Breeding

Wireless Talk broadcast by Station 5CL Adelaide on 2nd May, 1938.

[By Dr. JOHN HAMMOND, F.R.S., M.D., D.Sc. (Physiologist, Animal Nutrition Institute, Cambridge University).]

When you have begun to make improved pasturage and feeding conditions it is necessary to have improved animals, so that you can obtain an adequate cash return for the improvements made. Good breeding methods do not cost more than bad ones, and there is no reason why good methods should not be used.

I expect you know (as well as I do) the past and present methods of livestock improvement—how a breeder selects and mates together those animals with most desirable qualities. The breeder found out, too, that he succeeded best in this when the animals had best environmental conditions of feed and management for developing the qualities he was selecting. The modern improved animal is one which is a good converter of the food it eats into butterfat, meat, etc. Under conditions of poor nutrition the production capacity of the animal will be limited by the feed, and not by the breed of the animal. It is therefore only by putting the animals under suitable conditions of nutrition for production that proper selection can be made.

Domestic animals are kept in an artificial environment created by Man. The problem of how the environment should be arranged to suit the breed, or the breed selected to suit the environment is one of primary importance in animal production. On the solution of this problem will depend the success or otherwise of the livestock industry. Experiments have been done in which well-bred beef cattle were reared under high and under low planes of nutrition. It was found that those reared on the low plane of nutrition approached in body proportions to breeds of poor beef conformation. It is therefore not possible to select those having the possibility of good meat conformation under conditions of poor nutrition. In those areas in which nutritive and environment conditions are good, the improved meat breeds of farm animals have been developed.

In the earlier days of beef production in the Argentine, when most of the land was still prairie and before intensive methods of feeding were practised, it was found that the Beef Shorthorn imported from Great Britain soon degenerated. They had therefore continually to buy fresh bulls from Britain to keep up the quality of the stock. In recent years, however, with the development of special stud farms where the feeding is exceptionally good, it is only necessary to come back very occasionally for blood from the original source.

In selecting for milk and butterfat production little progress is made under those conditions in which the food supply is insufficient to develop the udder properly. For example, the yield of milk and butterfat produced after a cow calves depends on the type of feed given during the last 6 weeks or so before calving. Lack of feed at this time prevents the growth of the udder tissue, while the feeding of milk-producing foods encourages it. The inherent breeding possibilities of the cow for milk and butterfat are not tested unless a cow is so fed. It is by selection of those which respond to this treatment that strains having a high capacity for udder growth and butterfat production are developed.

An example of how raising the level of nutrition has enabled progress to be made in the breeding of sheep has come to my notice in recent years in the case of the Welsh mountain sheep. Under the hard conditions of life in the mountains they develop hardiness, but their mutton qualities are not good. By taking some down to the lowlands where they are well fed, proper selection can be made for mutton qualities (that is, the aptitude to fatten quickly) and rams can be bred and selected. By putting these improved rams out on the mountain a great improvement has been made in the mountain flocks.

Now let us consider how modern genetic research can be applied to the breeding of farm animals. While the breeding of plants can be done by research specialists, animal breeding must be done by the farmer himself, and so methods have to be devised which will enable the farmer to breed what he wants with greater certainty of result than now exists. For example, when a farmer obtains a herd of high producing cows he wants to maintain this level with a high degree of certainty, in place of the uncertainty and even slipping back which now exists.

Plant breeders have got over this difficulty and now can turn out varieties which breed true to type. The most promising method at the present time is the progeny test, for as everyone knows, it is not so much how an animal looks as how it breeds that really matters. Among dairy cattle and poultry in particular where the male is always the unkown factor as regards production, there is great need to develop the progeny test if the low yielders are to be eliminated *before* rather than *after* they are born. Years of work in building up a herd of high producing cows may be thrown away by the use of a bad bull in the herd; on the other hand, there is no quicker way of getting an improved herd than by using a good bull. The number of heifers coming into the herd in the next generation is at least 20 times as large for a bull as for any cow in the herd. By recording the yields of all daughters of a bull as soon as they come into milk, the breeding value of the bull for milk and butterfat production will soon be known. Like high yielding cows, high progeny testing bulls cannot be kept alive too long; and when such bulls are found it would appear advisable for a group of breeders to get together and exchange them after their period of usefulness in one herd has expired, that is, when their daughters come into the herd. If a progeny record of bulls are kept on a wide scale, we shall (even though the bulls themselves have gone) in the course of a few years be able to fill in the blank sire-side of the pedigree for milk. If one were breeding say for colour, and could only see the colour of the dams in the pedigree and never that of the sire, one would be at a loss and could not forecast the results of the breeding with accuracy. It is just the same in breeding for milk and butterfat.

Until such a time as we can get these blanks on the sire's side of the pedigree filled in, how shall we proceed to select our bull? The present system is to select the bull on his dam's yield and appearance. We now want not only this, but also to see the production records of the sisters of the young bull by the bull's sire, for these will show the worth of the bull's sire (now blank in the pedigree) for production. The next best thing to getting a proven bull is getting the son of the proven bull out of a good producing cow, for thus you are certain of having high production on each side.

Improvement of carcase quality in pork and bacon can also be made by progeny tests. This is the way in which Denmark has improved her pigs for the English bacon trade. At bacon weight, carcase measurements and points are recorded for the progeny of a sow. If these are satisfactory, the sow is retained in the herd as a breeder, and if not, she is discarded. In this way they have been able to increase the body length and reduce the thickness of the back-fat in the pigs in a comparatively short time.

In-breeding or mating together of close relatives has been the subject of much controversy. On one hand many of the pioneers of British livestock improvement have used it with great advantages, while on the other hand there have been cases where it led to degeneration, loss of vigour and fertility, and the appearance of abnormalities. In my opinion, *both* these views are correct, for in-breeding is only a tool to be used by the breeder, and like a tool may be used unwisely or well by those who handle it. When in-breeding closely in stock which have not been in-bred before, and therefore which are not pure one finds all sorts of hidden or recessive characters which make their appearance, for in order to make their appearance they have to be present in a double dose, one from the sire and one from the dam. Since animals with a single dose of such characters are usually normal, they can only be picked by in-breeding, for while they are mated with unrelated animals, they continue to produce normal animals.

In almost every breed there are latent, recessive, unwanted characters which appear from time to time. Too often when one of these makes its appearance in a strain the breeder covers it up by an out-cross which will hide it; to his own advantage, may be, but not to that of the breed as a whole, in which it will be perpetuated by this means. Instead he should eliminate all those animals which carry such defects.

What is one to do with animals which are culled in this way? They can be used quite profitably by cross-breeding with a male of some other breed which is not likely to carry the same defect, *e.g.*, the New Zealand Romney sheep breeders have for years been mating their culled ewes to Southdown rams, and producing first-class lambs from them. Where profitable use such as this can be found for culled animals, the pure-bred flock is considerably improved in the process, for it can be heavily culled without loss to the owner.

While agricultural shows have done much to guide the breeder as to the type of animal required by the Breed Society, there is still room for them to guide him further as to commercial requirements. This could be done, for example, by carcase tests for beef, lamb, pork and bacon; in these tests the owner is told by a score card the faults of his entry, and so knows how to breed in order to put these faults right.

In these days of almost universal testing and production records for dairy cows, these records might be sent in with the entry of the cow, so that in the show ring the cows can be grouped into high, medium and low producing cows, and come into the ring with blue, red or green labels respectively around their necks. The judge can then bear their production in mind when looking at the animals. This would form a means of obtaining a combination of both body conformation and production in dairy cattle.

Phylloxera and the Phylloxera Board of South Australia

[By J. L. Williams, R.D.A., Viticultural Instructor, Roseworthy Agricultural College.]

Introduction.

Quite recently, through the pages of a prominent trade journal, South Australian vignerons were accused of either being blind to the danger of Phylloxera appearing in the vineyard areas of this State or, ostrich-like, preferred not to think about it. The author of this accusation either did not know the true facts or was misinformed. As early as 1899 the vinegrowers and winemakers of this State, inspired by Prof. A. J. Perkins, showed commendable foresight by taking steps to safeguard the position as soon as it was known that Phylloxera had appeared at Rutherglen in Victoria.

A Board was created by Act (1) to advise the South Australian Government on matters relating to the insect and its control and to devise measures for keeping it out of South Australia. One result of this legislation is that our vineyards are still free, some 61 years after the insect was first discovered in Victoria.

When statements are made such as that mentioned above it becomes apparent that a general lack of knowledge exists concerning Phylloxera and the measures adopted in Australia for its control. For this reason the Board desires that South Australians should be forewarned of the consequences attendant on the accidental introduction of the insect to the vineyards of the State. The following account of the insect and its habits will serve to give the vinegrower an intelligent interest in the attempt to retain for South Australia its importance as the premier Viticultural State in the Commonwealth.

Phylloxera or Grape Vine Louse (German Wein Reblaus) is a minute insect or aphis visible only with difficulty with the unaided eye. It lives and reproduces inside gall-like outgrowths on the leaves of vines of American origin and also exists on the roots without seriously interfering with the health or well-being of such vines. On all varieties of European vine, *Vitis vinifera*, however, galls are not usually produced but the insect rapidly destroys the entire root system, resulting in the wholesale destruction of vineyards in the infected area. Once the insect is introduced to a large viticultural district, the vines in that district, other than those of American origin or those grafted on American stock, are doomed to destruction. It might be mentioned at this juncture that the American vine itself is of little value for its fruit, its only commercial virtue being that its roots are immune or resistant to the attacks of the Vine Aphis.

Historical.

Phylloxera is indigenous to the eastern States of U.S.A. and is thought (2) to have been brought to England and France between 1854 and 1860, on rooted American vines. These vines were introduced because of their resistance to a well-known fungus disease of the vine, commonly called "Oidium." The insect was originally discovered by Fitch in New York City, U.S.A., and he called it *Pemphigus vitifolii*. It was discovered in vine hot-houses in England by Westwood in 1863, first in leaf galls and later on the roots of vines. The disease was reported in France in the same year and soon caused extensive damage in important vineyard areas in that country.

By 1867 it had become so bad in France that a Special Commission (7) was appointed to investigate the trouble. Planchon was a prominent member of that Commission and he was the first of a number of men to study the insect and its habits in that country. He named the insect *Phylloxera vastatrix* and with the aid of Lichtenstein succeeded in making the leaf form live on the roots. Riley, an American, identified the different forms and corroborated the work of Planchon and Lichtenstein. Phylloxera spread rapidly throughout French and European vineyards, leaving devastation in its path.

The earliest records of the discovery of the disease in Australia were those occurring in Victoria at Fyansford in 1875 (7), at Geelong in 1877 (3), and somewhat later at Bendigo (3). An attempt was made by the Victorian Government to exterminate the pest by destroying the vines and sterilising the soil. This involved the Victorian Government in heavy expenditure and its efforts to stamp out the insect were unsuccessful.

Despite these stringent measures it could not be prevented from spreading to the Rutherglen district, where it was reported in 1899. This district was then the principal vine growing area in the Commonwealth, and in a short time the whole of the area was destroyed by the insect. The Victorian Government, realising the futility of trying to hold up the spread in this district, rightly decided to assist the growers to reconstitute their vineyards on the American Phylloxera resistant stock by means of grafting. This district has been unable to regain its former importance as a viticultural area. It must be mentioned that Phylloxera is still present in this district and very strict measures are in force to prevent its spread to clean areas in Victoria.

Some vineyards in New South Wales are infected, but the Government in that State has so far succeeded in confining it to certain areas, as in Victoria, by isolating such affected localities and prohibiting the interchange of all plant life between infected and clean districts.

In these two States, the Government Departments, by keeping important viticultural areas free from Phylloxera have performed a valuable service to the vinegrower and to the viticultural industry.

In Queensland, the insect is found in one small area near Brisbane, while Western Australian and South Australian vineyards are clean.

It is probable that South Australia owes her importance as a viticultural State partly to the early devastation of Victorian vineyards. When the South Australian Phylloxera Board was appointed in 1899 it was given certain powers to carry out the policy of preventing the introduction of the insect and to create a fund to assist growers in financing the reconstruction of their vineyards on resistant stock should the need arise. To provide this fund grape growers and winemakers have been levied (1) on an acreage and tonnage basis respectively. While the Phylloxera rate was levied winemakers and distillers were paying 6 pence per ton of grapes purchased and vinegrowers owning an acre or more in extent were rated at 3 pence per acre for vines two years old, 6 pence per acre for vines four to 8 years old and 1s. per acre for vines 8 years and over.

The Act empowers the Board to prohibit the introduction into South Australia from an infected State, the vine or any part of the vine, also any plant other than a vine which may have been growing in an infected area. An infringement of this section of the regulations covered by the Act renders the person liable to a penalty of £50. The Act also bestows on the Board certain other necessary powers for safeguarding the vignerons of this State.

One of the many precautions taken by the Board is to maintain a small nursery of American mother vines in Victoria in the event of it becoming necessary to establish a nursery in South Australia. Previous to this year the Board had in its possession a nursery at Howlong in New South Wales. This was considered to be far bigger and far more costly to maintain than the position warranted. This nursery was sold recently and a much smaller nursery was leased from and maintained by the Victorian Government at Wahgunyah for a small rental and maintenance charge.

The Insect.

The pest is a member of the insect order *Hemiptera*. Among other features of the insects included in this Order, the most important is probably the possession of piercing or sucking mouth parts. The Order is divided into a number of sub-orders and families. Phylloxera belongs to the sub-order *Homoptera* and the family *Aphididae*. This family in addition to Phylloxera includes a number of well-known insect parasites of plants, the American Woolly Aphis and the Green Peach Aphis, to mention only two.

Like the Apple Woolly Aphis, the Vine Aphis or Phylloxera possesses both aerial and root forms, and hence the vine, like the apple, can only be successfully grown on a stock resistant to the attacks of the insect. The life cycle of most of the Aphis family is somewhat similar and that of Phylloxera fairly typical. Among the insects, the Aphides are peculiar on account of their mode of development and the variety of forms (pollymorphism) exhibited in the different generations of the insect.

Biology of Phylloxera.

In appearance and habits the insect which forms galls on the leaves is different from the insect which lives on the roots. The insect of the leaf galls has been called *Phylloxera vastatrix gallicola* (⁴) and the root form *Phylloxera vastatrix radicicola*. The leaf-gall form does no direct harm but helps to propagate the insect. Galls are rarely formed on European vines but on most American species galls occur and are sometimes very numerous.

Perold (²) believes that the leaf-galls have never yet been observed in South African vineyards, either on American or European varieties, and he mentions, that, notwithstanding this absence of the gall-form, the insect does not seem to have been weakened during its long existence at the Cape. He says it would seem that a more dangerous and virile biological race of Phylloxera has been evolved there.

Börner, according to both Hewitt (⁵) and Müller (⁶), maintains that there are two races of Phylloxera, one occurring in the South of France and the other in Lorraine (Germany). For the former he retains the name *P. vastatrix* and for the latter the name *P. pervastatrix*. He finds that both attack European vines equally but that the *pervastatrix* race avoids certain American vines or their hybrids. He maintains that on these immune stocks the *pervastatrix* race cannot propagate itself and perishes and recommends that only those stocks which are immune from the *pervastatrix* race should be used in Germany and that in the course of time Phylloxera will die out. This, of course, could only happen so long as European vines are not grown in Germany on their own roots, and so long as the *vastatrix* race is not introduced. The existence of these two races has been confirmed by other workers in this field.

In Victoria, galls occur on the leaves of American vines in great numbers and are therefore an ever present source of infection, a condition similar to that existing in Southern Europe.

The insect in all of its forms is oviparous (egg-laying). The life cycle commences with—

1. *The Winter Egg or True Ovum.*—This egg is large when compared with the pseudova of later generations, is yellow at first, later becoming olive green and with a rough exterior. It survives the Winter in the crevices of the bark on the older wood of the vine, having been deposited there by the sexed female towards the end of the Summer or early Autumn. The Winter egg is the foundation of a colony of Phylloxera. From this egg hatches—

2. *The Fundatrix or Foundress of the Colony* (see plate figs. 3-6).—According to Imms (4) the fundatrices are seldom found on the European vine and he considers that they perish on that vine, while those on the American vine produce leaf-galls and in no case do they descend to the roots as was formerly maintained. The fundatrices are therefore purely leaf-gall formers.

The fundatrices deposit a large number of eggs and the progeny—

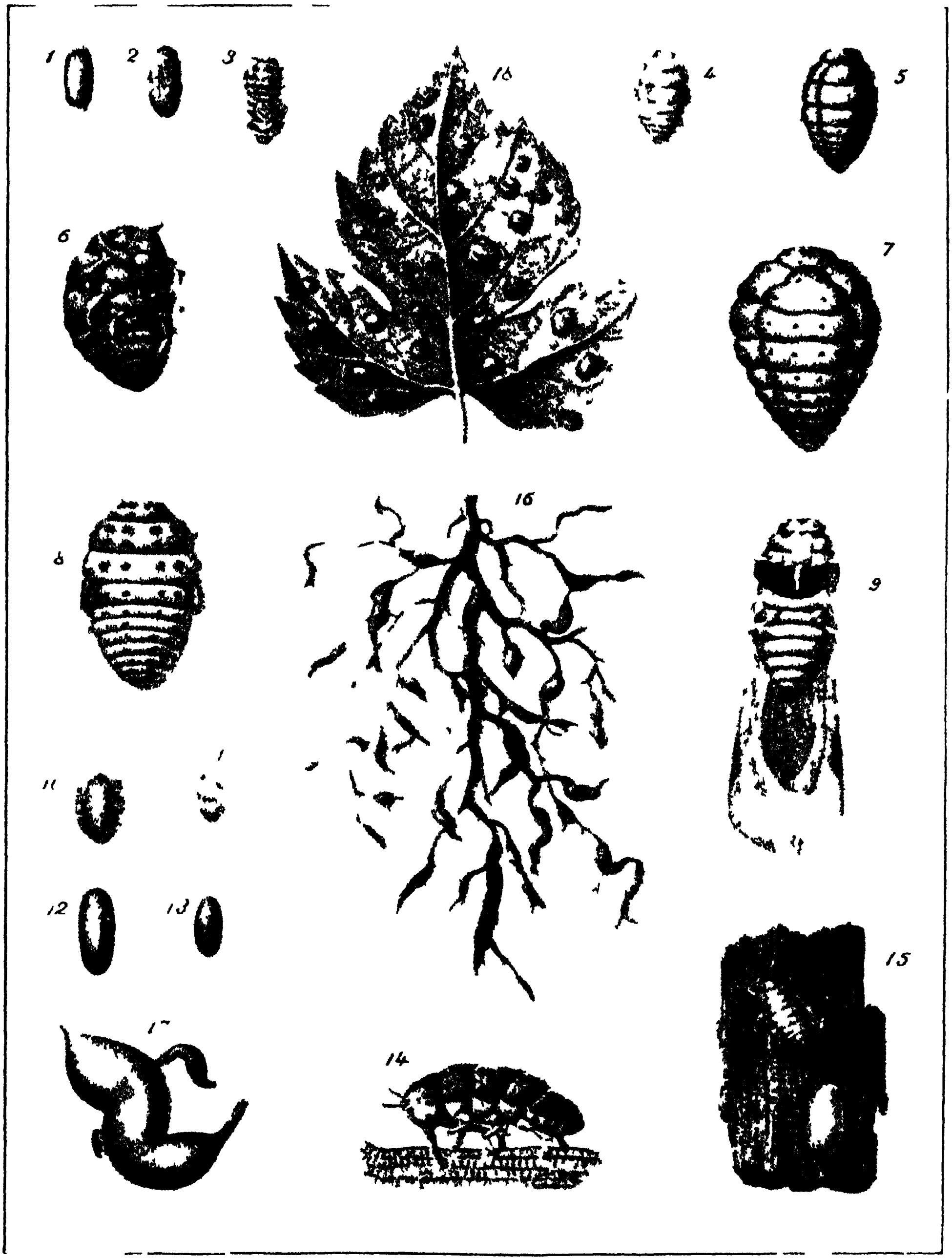
3. *Fundatrigenae are* dimorphic (two forms) in the first generation, viz. (*a*) Those which form galls or become gallicolae and (*b*) Those which descend to the roots and become radicicolae. The former pass through several parthenogenetic generations producing both gallicolae and radicicolae. The radicicolae or root forms also pass through several similar generations which may vary in number according to climatic conditions—a greater number occur in warm climates like Australia than in colder climates. In warm soils it shows a greater degree of virulence, and destruction progresses rapidly. Soil conditions too have considerable influence. In clay, clay loam and limestone soils, the insect appears to destroy the vines very quickly. Sandy soils on the other hand retard the progress of the insect, so much so that in some very sandy soils it is impossible to grow European vines on their own roots in a Phylloxerated area.

Like all other forms of the insect, the root form is oviparous and may continue its existence directly on the roots through a number of generations during the year and also from year to year without passing into other forms. This is probably what happens in South Africa and in Australia. These insects are apterous (without wings), yellowish brown in colour and just discernible with the unaided eye. Near the end of the vine growing season, July in Europe, some of these insects change into nymphs and come to the surface to moult and provide the winged or alate forms.

4. *Alatea.*—These insects possess delicate wings and are not capable of prolonged flight, but are carried by the wind for some distance to set up fresh places of infection. These winged females are said to deposit their eggs (pseudova) on the underside of the leaf, and occasionally on the older wood of the vine. The eggs deposited by this insect are of two kinds, from the larger hatch wingless females and from the smaller wingless males.

5. *Male and Female* (see plate, figs. 11 and 10 respectively.—These insects are sexuales, they are small and have no true mouth parts, the male being much smaller than the female. The female contains a single egg, the true ovum, and it is deposited about the fourth day after she hatches from the pseudova deposited by the winged female. It is considered that copulation by the male is not essential, but it is uncertain whether the eggs produced without copulation are fertile or not. From this egg, which is deposited in cracks and crevices of the bark, hatches the fundatrix in the early part of the following season.

The details of the life cycle on the European vine has occasioned some discussion, but it is thought probable that the root form (radicicolae) is the principal form of the insect on that host and that gallicolae are absent. When European vines are growing adjacent to heavily galled American hybrids the former are infected by the progeny of the gall-form of the latter. In Victorian



[Plate

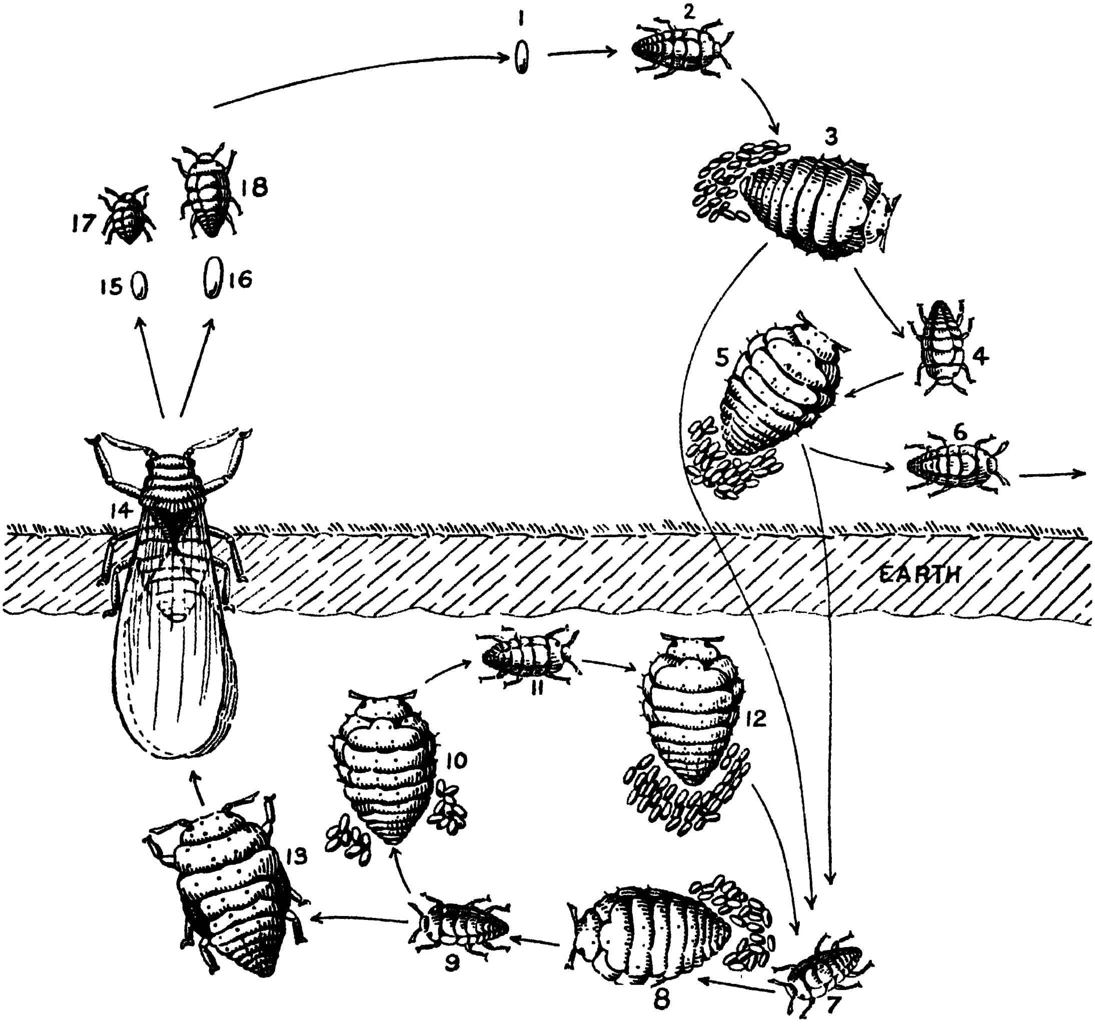
1 Winter egg [illegible] 2 Same commencing to hatch the embryonic contents are visible 3 Young gallicola coming out of the egg 4 Young gallicola of more advanced age 5 Adult gallicola as seen from above 6 The same as seen from the underside (three-quarter view) 7 Adult radicicola 8 Nymph 9 Alate of winged female as seen from the underside 10 Sexed female showing the contained ova (winter egg) 11 Sexual male 12 and 13 Eggs from which hatch sexuales female and male respectively 14 Radicicola feeding on a young root 15 Sexual female after depositing the winter egg 16 Showing the deformed appearance of the small roots of the vine due to the radicicolae 17 Detail of gall or deformed rootlet similar to those shown in Fig 16 18 A vine leaf showing galls produced by the gallicolae

[illegible]

vineyards, suckers from the hybrid stock are prevalent and these are always heavily galled, enabling the insect to exist and complete the cycle each year in the normal manner.

The Damage that Phylloxera Does.

The radicicolae on most American vines do little or no harm, but different species of these vines show varying degrees of resistance and the same applies in the instance of the hybrid stocks. Some American species and some hybrids therefore are useful as stocks while some have to be discarded as useless, although in some countries where Phylloxera, due to climate, is less virile certain stocks with low resistance may be successfully used. All European varieties however succumb, the insects literally swarm over the roots, puncture them and



DIAGRAMATIC REPRESENTATION OF THE LIFE CYCLE OF PHYLLOXERA.

1. Winter egg. 2. Young louse. 3. Adult laying eggs. 4, 5, and 6. Summer leaf louse (*Radicicolae*). 7, 8, and 9. Summer root louse. 10, 11, and 12. Winter root louse. 13. Nymph. 14. Winged female. 15 and 16. Eggs. 17 and 18. Male and female sexuales.

NOTE.—Figures 10, 11, and 12 in above diagram depict the over-wintering insects. These insects are only active towards the latter end of summer and in early spring. During winter they are dormant.

suck up the cell juices, causing nodosities on the smaller roots which eventually die. Each of the newly-formed roots are attacked in turn until the vine can no longer obtain mineral food in soil solution.

Larger roots when attacked do not die immediately but hold on for three to five years, depending on the virulence of the insect and the individual resistance of the vines concerned, weak vines being more easily destroyed than healthy vigorous vines. On the larger roots the cortex is loosened, rots and scales off under the irritation of the insects and the vine after death is easily removed from the soil owing to the rotted condition of the roots. As soon as one vine is so weakened that no further roots are formed the insects move on to healthy vines adjacent, hence when looking for the insect always inspect the roots of apparently healthy vines on the edge of a Phylloxera patch.

The insects spread underground from vine to vine in ever widening circles from the originally infected vine in the centre of the patch. Such a patch is readily detected by one familiar with the habits of the insect. During the growth period of the vine the patch appears as a round depression, the vines in the middle being smallest and weakest. At a later stage odd vines will die and these can in some cases be pulled out by hand. Affected vines produce poor, short, rather brittle canes and during summer stop growing sooner than do the healthy vines. Leaves turn yellow, drop early and the grapes ripen poorly. In the year immediately following the appearance of a Phylloxera patch, other patches will be noticed scattered throughout the vineyard until eventually only a few apparently healthy vines remain. These patches are established by the winged form of the insect but probably more frequently by the root form transported on soil attached to vineyard implements, such as the plough. It has been stated that in the year of attack the vines usually produce an abnormally heavy crop, but it must be conceded that this may also be due to other causes.

Methods of Spreading.

The insects probably crawl in and on the ground from vine to vine. As the winged form, these are carried in the direction of the wind and in this way cover considerable distances. Eggs and insects may be carried on the boots and by similar means. Infected vines or parts of vines may be carried away by floods and deposited at some distance from the source.

The winter egg is highly resistant and does not easily lose its vitality. In the past the insect or eggs have frequently been carried into a clean district on vines or their cuttings and other plants from an infected area, and in most cases by persons who are unaware of the evil they are unknowingly committing.

It is evident from the above that it is necessary to take every conceivable precaution in order to prevent its introduction to the vineyards of this State.

Control of Phylloxera.

Here it is necessary to distinguish between (1) methods aimed at complete eradication of the insect and (2) those having as their object the successful growing of vines in the presence of the insect, by the employment of modifications in the methods of vine husbandry.

In all countries where Phylloxera has been introduced methods aimed at complete eradication of the insect have never been completely successful, although in certain cases they have been the means of temporarily holding up the invasion, for which reason they should not be discarded as absolutely valueless, because even if complete destruction of a large vineyard area is inevitable, the holding up of the invasion, even for only a few years, might be of definite value.

Methods aimed at complete destruction involve the uprooting of the infected patch and a considerable area of surrounding vineyard, heaping the vines, spraythem with some inflammable material and burning. Soil sterilisation is then carried out, using heavy doses of carbon bisulphide. Such land is not planted with vines again for a number of years and is subjected to frequent examination. However, ultimately the American stock and its hybrids will need to be introduced, having proved to be the only really successful means of growing vines where Phylloxera has once made its appearance. In the vine areas of the world where the insect has appeared, extensive experimental work and research have been undertaken, often involving very heavy expenditure.

Compared with South Australian viticulture, the growing of vines on the American stock is a difficult and expensive business and the longer we can delay the time when we will have to use these methods of cultivation the better. The South Australian vinegrower, in the event of an outbreak of the disease, will be in an infinitely better position than Victorian vignerons found themselves in when the pest had to be combated in that State.

Many stocks tried in other countries have proved unsuitable under the particular soil and climatic conditions prevailing in Victoria and New South Wales. Similarly, all European varieties do not graft readily with certain resistant stocks, some making suitable and some unsuitable combinations. Many costly mistakes have been made but the information accumulating from such instances together with a fund of valuable data secured from various experimental institutions, and the gradual development of improved stock by plant breeders will make it possible for South Australian vignerons also to avoid the mistakes made in the past. This will give South Australia a much more certain basis for the work of reconstruction when and if the need arises.

Resistant Stocks.

It would be quite superfluous here to attempt to treat the question of Resistant Stocks in view of the able manner that this highly important aspect of vinegrowing has been summarised by F. de Castello (8) through the pages of the *Victorian Journals* of the Department of Agriculture, and the reader is referred to this work for a detailed study of the stocks available and their adaptability to Victorian conditions and their affinity for common varieties.

It is however anticipated that some experimental work of a less involved nature will be needed before South Australian requirements will be fully met. However, in the light of our present knowledge of the insect, nothing would be gained by instituting this work before an actual outbreak in the State and the introduction of the stocks required might easily result in the introduction of the insect.

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Wireless Talks

The Eradication of Weeds

Summary of Talks by G. H. Clarke, B.Sc., Botanist, Waite Agricultural Research Institute, and Broadcast by Station 5CL.

The subject of Eradication of Weeds is a many-sided one, and the selection of the method of attack most suitable for a particular weed naturally involves considerations of many different kinds.

First of all we must consider the weed itself. It may be an annual, a plant which lives for but a single year: our purpose will then be to prevent it from maturing its seed, and we have a choice of many methods of achieving this end. If it be a weed of cultivated ground the method selected may differ accordingly as it is winter-growing or summer-growing. Or it may be perennial, in which case the task confronting us may not be quite so easy. We shall need to know, in this instance, not only whether its main growth takes place during winter or summer, but also whether the major portion of the plant is above or below the ground, and, as regards its underground portion, whether this is compact and bulbous, or diffuse and extensive, and so on. In short, a thorough knowledge of a plant itself is an essential preliminary to attempting its eradication.

The next consideration is the situation where it is growing: whether on roadsides or paths, in lawns or garden beds, in orchard lands or vineyards, on farm lands, or in pasture or vacant ground. We must also take into consideration the area covered by the weed: whether it be an isolated plant, a few square yards, or square chains, an acre or two, or hundreds of acres.

Finally we must consider its distribution, namely the extent to which it occurs throughout the State. It might not be economically sound, for example, to spend two or three hundred pounds in eradicating a particular weed from a given area of ground; but, if this happened to be the only patch of the weed, it might, in some instances, be worth while spending many times this amount in exterminating it so as to prevent its becoming established in other parts of the State.

As regards the *methods used* for the eradication of weeds, these are usually classed under the three headings, namely *mechanical methods, biological methods,* and *chemical methods.*

Control by Mechanical Methods.

Mechanical methods include all such operations as hand-pulling, digging, hoeing, cutting, mowing, cultivation, ploughing, and so forth. They are the most generally used and the most important—as well as the most arduous—of all the methods in use. While much labour can be saved by intelligent management, and by the judicious use of chemical eradicants, no holding can ever be kept free from weed growth without a good deal of labour of this kind. One form of mechanical control is worthy of special mention, since it has not been used much in this country and is ideally suited to certain small areas such as, for instance, the home vegetable garden. I refer to the use of tarred paper as a surface mulch. Paper mulch was first used on an extensive scale about 1923 with the object of preventing the rank growth of weeds in sugarcane plantations in Hawaii, but has since been developed chiefly in connection with pineapple growing. About 90 per cent. of the Hawaiian pineapple crop is stated to be grown under paper mulch. It has been tried in Queensland where, however, the cost of the paper makes it more economical to use a cheaper form of mulch. In America, special asphalt papers are on the market made in various widths and weights, and with or without perforations. The paper is sometimes laid in strips with a row of vegetables planted between. The usual method, however, is to cover the prepared bed with paper, the edges being weighted or fastened down. Seedlings are then planted the desired distances apart, either by making holes in the paper or by arranging them in the perforations with which some of the papers are provided. By excluding light, the paper effectively prevents the growth of weeds. It also keeps the temperature conditions more uniform, checks evaporation from the soil, and is said to increase nitrification.

Control by Biological Methods.

Biological methods aim at controlling weeds indirectly, either by means of insect enemies, or by subjecting them to competition with more vigorous plants. Insect control methods are of great value in the case of weeds of especial economic significance on account of their wide distribution. The development of this method requires expert knowledge and much preliminary experimentation. The most outstanding success that has been achieved in Australia by this method is in the case of the Prickly Pear.

Competition with other plants offers perhaps the most suitable means of controlling, on a large scale, the weeds of pasture lands. By proper management of a pasture it is often possible to alter the balance of competition of its constituent species in such a way as to favour certain ones and depress the growth of others. Sometimes this can be effected by drainage; some weeds, and certain other plants of low pasture value, *e.g.*, sedges, thrive in poorly drained, swampy situations. The drainage of such areas may be followed by the gradual disappearance of these, and by the appearance and spread of more desirable grasses and fodder plants. Again, some weeds do not like superphosphate: addition of this substance, therefore, will depress the growth of these whilst favouring that of clovers and grasses. By sowing superior strains of grasses and clovers, by top-dressing, by controlled grazing, and other means, it is often possible so to weaken the less desirable species that they are easily overcome by the competition of the more vigorous and useful pasture plants.

The planting of pine forests has proved in some instances to be an effective method of bringing into useful production land so infested with weeds as to be otherwise valueless. So dense is the shade afforded by the massed, dark-green, needle-like foliage of these trees that pine forests are practically bare of all other plant growth.

Control by Chemical Methods.

Just as superphosphate, though a valuable manure, can be looked upon as herbicidal to the extent that it depresses the growth of some species whilst it stimulates that of others, so we find that of the chemical substances used as weed-killers some are of value also as fertilizers. Perhaps the best known of these is *sulphate of ammonia*. This is an extremely useful substance for destroying certain weeds such as, for example, clover in lawns. At the same time it supplies an easily available form of nitrogen which stimulates the growth of the lawn grasses. It may be applied at the rate of ½oz. to the square yard, either dry, or in the form of a 5 per cent. solution (½lb. per gallon of water), the lawn being well watered a day or so later.

Other substances which have recently come into use as weedicides are *calcium cyanamide* and *ammonium thiocyanate* (also called *ammonium sulphocyanide*). The latter is a biproduct of coke works, but unfortunately is too expensive as yet to be used except on a small scale. It is very toxic to plants and kills them rapidly, while it is free from many of the disadvantages connected with the use of sodium chlorate and preparations of arsenic. Within a few weeks it decomposes in the soil with the production of ammonia and sulphur, which are desirable fertilizers.

Another chemical which, though not actually a fertilizer, has an action on the soil which is probably beneficial, at any rate under South Australian conditions, is *sulphuric acid*. It possesses the advantages of acting rapidly, of not drying up, and of being less dependent on weather conditions than most other sprays. Incidentally it is relatively cheap and capable of being employed on a moderately large scale. On the other hand it requires spray equipment with special acid-resistant metallic parts, and a certain amount of care must be exercised in mixing and handling it. Used in strengths of from 7-10 per cent., by volume, of the commercial acid, sulphuric acid is used very extensively in Europe, especially in France, for the control of annual weeds in cereal crops. It has been found to be particularly effective in destroying Charlock and other Cruciferous weeds. In practice the entire crop is sprayed when the cereal plants are about six or seven inches high. The cereals are more resistant than the weeds and are not harmed by the spray.

At the other end of the scale we have chemical weedicides which are not in any way beneficial to the soil and may, indeed, render it, in varying degrees, unfit for the growth of plants, and for varying periods of time depending upon the quantities used. The first that we may mention is *common salt*. This substance is often used as a weed-killer, and it is suitable for paths and gravel walks and other situations where its effects on the soil do not matter. Large amounts must be used for the destruction of perennial weeds, and so it is apt to prove costly when used on a large scale. Its main advantage is convenience of application: a handful can be placed on each weed as it comes up.

Of the chemical weed-killers in general use, however, the most important by far are the *chlorates* of sodium and calcium, and preparations of arsenic. None of these is in any sense a fertilizer, and when applied in quantity to soils they render them temporarily unfit for the growth of plants. But with the more refined methods of application now coming into use the residual effects can be minimised to a very large extent. Furthermore, very dilute solutions of chlorates can be used for selective spraying without causing appreciably harmful effects on the soil. For instance, a tennis court may be safely sprayed with 2-3 per cent. sodium chlorate which will destroy many of the weeds without serious injury to the grasses or noticeable effect on the soil. The chlorates and arsenicals, and their use for the destruction of perennial weeds require a far more detailed consideration than can be attempted here. It must suffice to stress their importance and to state that they form the bases of many commercial weed-killers.

Groups or Classes of Weeds.

1.—Annuals.

From a study of the various plants listed as weeds it becomes possible to arrange them in groups or classes which exhibit, varying types and degrees of aggressiveness, and require each its own particular methods of control.

By far the largest class of weeds is that of short-lived plants or *annuals*, among which we may for convenience include also biennials, and even some short-lived perennials. Now, I do not propose to say a great deal about annuals because, if they are the most numerous they are also the most easily destroyed of all weeds. It will suffice to say that the method in most general use for controlling them is cultivation after their seeds have been germinated by rain: measures which are part of the normal routine of preparing a seed bed. Other methods are the prevention of seeding, in the case of mature plants, grazing by sheep, especially on fallowed land, and, in some cases, selective spraying of weed-infested crops with suitable weed-killers.

2.—Perennials.

More serious than annuals are the *perennials* or long-lived weeds. Very often a perennial plant does not flower until the second or third year of its growth, and it may escape recognition until the flowers appear. During this period such a weed will have been firmly establishing itself strengthening its root system, and building up reserves of food to enable it to overcome the competition of other plants, and, incidentally, to resist the measures subsequently undertaken for its eradication.

But not all perennial plants are serious weeds. We can, in fact, subdivide the perennials into three groups, or subclasses, according to the type of root system present, and the relative proportions of the plant above and below the ground.

A.—Perennials with Main Portions Above Ground.

To the first subclass belong those weeds in which the root system is relatively small and incapable of producing new aerial shoots from small detached fragments. This group includes both herbaceous plants, like Horehound, Wild Onion, and False Caper, and shrubby or arboreal species like Blackberry and Boxthorn. While the control of any or all of these may at times be difficult, the difficulties encountered are usually economic rather than scientific. It is not that we do not know how to get rid of them, but that economic considerations may stand in the way of our doing so. For example, both Horehound and Wild Onion can be controlled either by cultivation or by spraying with chlorates; but, in some situations the first method cannot be used, and the second is often too costly. The same type of difficulty applies to weeds of the Blackberry and Boxthorn type which, actually, can be got rid of where economic considerations permit. Many shrubs can be exhausted by the repeated cutting down of their tops. In the case of Blackberry the foliage can be treated with a chlorate spray, either with the object of killing the plants. or with a view to subsequently burning and clearing away the surface growth, so as to gain access to the area and deal with the surviving plants. In the case of trees and large, single-stemmed shrubs, arsenical solutions can be applied to the freshly cut stumps, or deliquescent pastes containing arsenic or chlorates, or even bluestone, can be applied to frill rings cut close to the ground, or placed in auger holes bored slantwise through the outer parts of the stem or trunk.

But whatever be the method selected, the important thing is to choose a time when the plant is least able to resist attack, that is to say, when the whole of its reserves are above the ground. The production of fruits and seeds causes a severe drain on the resources of a plant; if, therefore, such weeds as Blackberry are attacked when the berries are commencing to ripen, and before, as we say, "the sap descends," then the results will be much more effective than the same treatment undertaken at another time.

The remaining two subclasses are distinguished by having their main parts situated below the ground, and, almost without exception, all the really serious weeds are of this type.

B.—Deep-rooted Perennials.

This group includes weeds of the *Convolvulus* type, and it is characterised by the presence of an underground system which may reach great depths in the soil. In addition to the branches growing downwards, the system comprises horizontal branches, and others growing upwards towards the surface and forming new aerial shoots at varying distances away from the original plant. Most weeds of this type grow readily from small detached fragments of the underground system, so that attempts to dig them out often make matters only worse by breaking up the root sytem and spreading the fragments further apart. Another weed of this type is Hoary Cress; and it is no uncommon thing to find paddocks of several acres extent almost covered with this weed, traceable to one originally small patch which has been spread by the farming implements during ploughing and cultivation. This group comprises a large number of weeds and many of them possess a bad reputation. In addition to *Convolvulus* and *Hoary Cress*. other examples are *Skeleton Weed*, *St John's Wort*, *Nutgrass*, *Bracken Fern*, *Couch Grass*, *Bladder Campion*, *Camel Thorn*, *Russian Knapweed*, *Perennial Ragweed*, *Liquorice Plant*, and others.

In most of these weeds the parts above ground are innocent in appearance, and are so small in comparison with those in the soil, that, without a great expenditure of labour and time, it is impossible to exhaust the latter by cutting or cultivation of the surface growth. While cultivation may be useful in some instances, it must be carried out at frequent intervals, and persevered with, sometimes for a period of years, in order to give satisfactory results. Alternative treatments are competition with sown pastures, and the employment of chemical weed-killers such as coarse salt, chlorates of sodium and calcium, or arsenic and caustic soda. These substances can be applied direct to the soil, but, despite certain advantages such as ease of application, it is usually more economical and more effective to apply chlorates and arsenicals in the form of sprays to the foliage of the weeds, choosing conditions which will allow, not only of penetration by the liquid, but also of its downward movement as far as possible into the roots. The important points to be observed in attempting the chemical control of deep-rooted perennial weeds by spraying are:—(1) That at least three sprayings must be given each year; (2) that the first spraying should be given when the plants are in flower; (3) that the spray should be applied when the soil is dry; (4) that the foliage should be well saturated with the liquid; (5) that the operation is best carried out towards evening, or on a dull cloudy day; (6) that subsequent seedling growth should be watched for and destroyed by cultivation or other means.

C.—Bulb-forming Perennials.

The last group of perennial weeds comprises the bulb and corm-forming species including the Cape Tulips and their allies. Bulbs and corms are compact more or less globular underground structures, serving for perennation, storage for food, and vegetative multiplication. The corm differs from the bulb in having all the leaves thin and scale-like, whereas the inner leaves of the bulb are thick and fleshy, like those of an onion.

CAPE TULIPS.

In the Cape Tulips the corms represent the truly perennial parts of the plants. What appears above ground is a succession of leaves—perhaps only one each year—followed, during the final year of growth, by a flowering shoot. Flowering may not occur until the second or third year of growth, but the process of flowering exhausts the parent corm and terminates the life of the particular individual. But ample provision is made by the plant to ensure the continuance of the species, and the way this is achieved constitutes an important difference between the two kinds of Cape Tulip occurring in South Australia.

In the Single-leafed Cape Tulip flowering is followed by the production of large amounts of very small seed which is easily dispersed, and which constitutes the means by which this weed spreads to *new ground.* At the same time, however, the plant ensures the retention of its hold on the *same ground* by forming new corms—one large one and one small one—in place of the original parent corm which now dies.

In the Two-leafed Tulip, however, the seed pods are usually empty of seed, so that reproduction by seed evidently does not take place to any great extent. Consequently this Tulip does not, of its own accord, spread rapidly to new ground. Against this, however, it is very much more efficient than the one-leafed species in retaining and strengthening its hold on the ground it already occupies. Instead of forming only two corms—one large and one small—at the base of each flowering shoot, it produces two large corms, and, in addition to these, large numbers of miniature corms termed *cormils*, each about the size of a rice grain. Cormils are formed both below ground, and in the leaf axils above ground, and each one is capable of giving rise to a new Tulip plant. Owing to cormil formation, the Two-leafed Tulip increases in density very rapidly on any area on which it grows, but, so long as it is not disturbed, it does not spread very far afield; in fact, its spread to new areas is usually caused by the mechanical transport of corms and cormils.

These differences between the two plants are very important, so much so, that it is unfortunate that the name *Cape Tulip* has come to be applied to both plants.

Of the methods in use for the control of Cape Tulips, perhaps the most generally useful is cultivation followed by competition with annual crops. Both Tulips are essentially weeds of pasture land and do not compete very successfully with cereals, though they are liable to appear more thickly than ever if such land is subsequently allowed to remain idle. Cultivation and cropping over a limited period with a view to the re-establishment of a pasture free from the Tulip will in most cases—and specially in that of the Two-leafed species—require to be supplemented by chemical treatments in order to be successful. In other words, the purpose of the cultivations will not be so much to get rid of the weed as to thin it out and reduce its growth to manageable proportions with a view to chemical eradication of the surviving plants.

While cultivation can be used for the Single-leafed Tulip in almost any district in which it occurs, in the case of the Two-leafed plant this practice has the disadvantage of breaking up the clumps of plants and spreading the cormils more evenly over the area cultivated. In districts of low to moderate rainfall, such as the Adelaide Plains and parts of the Lower North, this does not matter so long as the cultivations are persevered with—and if necessary supplemented by other treatments—until all the cormils and cormling growth are destroyed. But in high rainfall districts, and especially in parts of the Adelaide Hills, the relatively moister conditions that obtain make it exceedingly difficult to destroy cormling growth, and in such areas the spreading of cormils is a serious objection to the use of cultivation. It is for this reason that the Two-leafed Tulip must be regarded as an especially serious weed in the Hills Districts. The best procedure we can suggest in the present state of our knowledge for controlling the Two-leafed Tulip in these areas is to leave the infested ground undisturbed, and to divide the area into concentric zones, and then, commencing with the outermost zone, to spray with 10 per cent. sodium chlorate or some other suitable weed-killer. A method which shows some promise and can be applied on small areas is to inject kerosene into the bases of clumps of plants so as to allow it to come into contact with the corms underground. The possibility of using crude oil for the eradication of these weeds is also worthy of being fully explored.

Agricultural Bureau of South Australia

Conference of Lower South-East Branches

Although established only a little over 12 months ago, the Robe Branch sponsored one of the best Bureau Conferences that has been held in the Lower South-East Delegates to the number of over 150 were present from centres over 100 miles distant, and the following Branches were represented:—Mount Gambier, Kongorong, Glencoe, Penola, Allendale East, Coonawarra, Kingston, Millicent, Kybybolite, and Robe. With the assistance of Messrs. S. Williams, T. Reid, A. Collison, and C. A. Goddard, prominent men in the wool trade of South Australia, the Robe Branch staged an exhibit of fleeces from pastoral properties in the North, North-East, North-West, Adelaide Hills, and South-East districts of the State. This proved to be an outstanding feature of the Conference.

The Department of Agriculture was represented by Messrs. S. Shepherd (Vice-Chairman) and S. Williams (Members of the Advisory Board of Agriculture), R. C Scott (Chief Agricultural Adviser), H. B. Barlow (Chief Dairy Instructor), C. A. Goddard (Assistant Lecturer in Woolclassing at the School of Mines), W. C. Johnston (Manager, Kybybolite Experiment Station), E. S. Alcock, W. H. Downes, and A. L. Warren (District Advisers), H. C. Pritchard (General Secretary), and F. C. Richards (Assistant Secretary of the Agricultural Bureau).

Mr. E. Banks presided, and Mr. S. Shepherd delivered the opening address. The following papers were read:—"Wells and Pumps," Mr. G. A. Downing (Kingston); "Coast Land and its Possibilities," Mr. A. Thompson (Kingston); "Trees and Shrubs on the Farm," Mr. A. D. Adamson (Penola); "The Fat Lamb Farm," Mr. W. L. Barrows (Mount Gambier); "The Woollen Industry," Mr. R. B. Vine (Kingston); "Breaking up Heath Country," Mr. N. Hayes (Robe). Mr. I. McDonald, B.Sc., B.V.Sc., of the Council for Scientific and Industrial Research, addressed the Conference on "Investigations into Coast Disease."

It was decided that the 1939 Conference should be held at Kingston; that concerted action be taken by the Government to develop a "weed consciousness" both officially and among individuals.

At the evening session Mr. Scott gave an illustrated lecture on the Phosphate Deposits of Nauru and Ocean Islands.

The Secretarial duties of the Conference were ably carried out by Mr. T. Brown.

Parafield Egg-Laying Competition, 1937-38

Review of the Competition for the Month of April, 1938

[By C. F. ANDERSON (Chief Poultry Adviser and A. CLIFTON (Competition Attendant).]

April is the first month of the Competition for the 1938-39 series. The rate of production for the first month has been exceptionally good, and if it is any indication of the scores to follow, a good season is assured. The production for April was 35.83 per cent., an increase of nearly 3 per cent. over that of April, 1936, which was the previous best April in the Competitions conducted at Parafield Poultry Station.

The White Leghorn single entered by Mr. T. Reese laid 23 first grade eggs for the month, the trio entered by the same breeder laid 59 eggs, and the team 106 eggs for April, compared with 85 for the leading team for the same period in 1937. In the section for Black Orpington singles there are 3 birds each with a score of 23 first grade eggs, and 3 more birds each with 21 first grade eggs. This compares more than favourably with any bird in the same section in previous competitions. Quite a number of new competitors are doing well at the commencement of the competition. The principal ones are C. R. Bolto, A. R. Mayger, and two new competitors from Moonta—Messrs. W. J. Thomas and W. L. Evans. The Sussex birds for the month of April are not quite up to the previous year's figures, but are still satisfactory. It is very noticeable in this section that many birds were too backward, and quite a number did not lay an egg during the whole month. It is also very interesting to see the trio of White Wyandottes entered by Mr. E. R. G. Lang making such an excellent start. One bird here also laid 23 first grade eggs, and the trio laid 60 for the month. In the Home Project Section the leading score is 24 first grade eggs, as against 20 in this section in 1937. This bird has the highest score of any competitor in the competition, and was entered by Master K. Ekers, of Mount Compass.

The birds generally appeared a good lot in this competition, particularly the White Leghorns and the Orpingtons. In the other sections, however, there were a number of very backward birds.

In the Soaked Grain Section similar results have been experienced for the first month as in the previous Competition, that is, the excessive number of birds that went into a moult during that period. Over 25 per cent. of them this year have moulted, from the light neck moult to almost a full moult.

The feeding for the Wet Mash Section this year during the month under review was equal parts of bran, pollard, and wholemeal, 10 per cent. meat meal, 5 per cent. linseed meal, and 40 per cent. greenfeed, with wheat at mid-day and at night.

The birds settled down very well at the commencement of the competition, and were eating particularly well within the first few days.

Feeding Tests at Parafield Poultry Station.

A new series of feeding tests was commenced at Parafield Poultry Station on the 1st April, 1937. Five tests have been arranged each of 50 White Leghorn pullets. The principal object of these tests is to collect some accurate data concerning the results obtained from the soaked grain method of feeding in different ways, also the production of the birds under the various methods of feeding. The following is a list of the tests that have been arranged:—

A. Morning—Soaked wheat at rate of 8lbs. grain per 100 birds, meat meal ½lb. per 100 birds, greenfeed same quantity as dry grain. Afternoon—Same as morning, but meat meal ¼lb. per 100 birds.

B. Morning—Soaked wheat at rate of 8lbs. per 100 birds, ½lb. meat meal per 100 birds, ¼lb. linseed meal per 100 birds,

greenfeed same as No. 1 test. Afternoon—Same as morning, but without the ¼lb. linseed meal.

C. Morning—Soaked wheat once a day at rate of 8lbs. per 100 birds, meat meal ¾lb. per 100 birds. Afternoon—Dry wheat at rate of 1¼ozs. per bird.

D. Morning—Soaked barley twice a day at rate of 8lbs. per 100 birds, greenfeed same quantity as dry grain, meat meal ¼lb. per 100 birds. Afternoon—Greenfeed same quantity as dry grain, meat meal ¼lb. per 100 birds.

E. Morning—Soaked wheat and barley at rate of 4lbs. wheat and 4lbs. barley per 100 birds, greenfeed same bulk as dry grain, meat meal ½lb. per 100 birds, linseed meal ¼lb. per 100 birds. Afternoon—Dry grain at rate of ¾oz. wheat per bird and ¾oz. barley per bird.

The quantity of food as stated in the test will vary from time to time according to the requirements of the birds. The quantities stated in the tests are given as a basis, but are also liable to alteration according to the requirements of the stock.

Test.	No. Eggs Laid from 1st April, 1937, to 31st March, 1938.	No. Eggs Laid. April, 1938.	Total Eggs Laid from 1st April, 1937, to 30th April, 1938.
A	7,076	155	7,231
B	7,281	166	7,447
C	7,050	185	7,235
D	6,518	148	6,666
E	6,829	164	6,993

	Value of Eggs. 1st April, 1937 to, 31st Mar., 1938.			Value of Eggs. April, 1938.			Cost of Food. 1st April, 1937, to 31st Mar., 1938.			Cost of Food. April, 1938.			Return Above Cost of Food, April, 1938.			Total Return Above Cost of Food, 1st April, 1937, to 30th April, 1938.		
	£	*s.*	*d.*	£	*s.*	*d.*	£	*s.*	*d.*	£	*s.*	*d.*	£	*s.*	*d.*	£	*s.*	*d.*
A	33	13	3	1	0	3	12	13	0	0	18	0	0	2	3	21	2	6
B	34	5	4	1	1	8	12	10	1	0	18	0	0	3	8	21	18	11
C	33	8	10	1	4	2	12	12	1	0	18	0	0	6	2	21	2	11
D	30	0	5	0	19	4	13	16	8	0	18	6	0	0	10	16	4	7
E	31	17	0	1	1	5	13	3	10	0	18	3	0	3	2	18	16	4

Tubercle Free Herd Scheme.

The following herds have been tested and comply with the conditions laid down by the Tubercle-Free Scheme, whereby stud-owners may apply to have their herds tested, free of charge, by the Stock and Brands Department:—

Owner and Address.	Cattle. No. of	Date. Expiry
1. J. H. Dawkins, Para Wirra Jersey Stud	25	16/4/38
2. W. Hawker, Anama Friesian Stud, Central Bungaree, *via* Brinkworth	37	25/11/39
3. O. H. Woodward, Marama Jersey Stud, Gilles Plains	22	2/11/38
4. G. L. Hampton, Cloverdale Illawarra Shorthorn Stud, Echunga	25	12/8/39
5. J. M. Bray, Sweethaven Jersey Stud, Langhorne's Creek	26	19/8/39
6. Kybybolite Experimental Farm, Kybybolite	88	1/9/39
7. A. Kelly, Alexandra Jersey Stud, Milang	38	21/10/39
8. Agricultural College, Roseworthy	70	9/11/39
9. E. F. Schulz, Eden Valley	30	16/12/39
10. M. A. Clark, Echunga	6	19/11/39
11. A. R. Withers, Nalpa Station, *via* Strathalbyn	251	6/4/40
12. J. H. Dawkins, Para Wirra Jersey Stud, Gawler River	24	7/4/40

Production and Exports.

The production of butter and cheese for March, 1938, was:—Butter, 1,235,355lbs.; cheese, 1,084,126lbs.

Meat exports (figures taken from statistics supplied by the Australian Meat Board)—

	Total Australian Exports, July, 1937-31st March, 1938.	
	Carcasses.	
Mutton	686,346	(S. Aus., 125)
Lamb	4,315,914	(S. Aus., 329,924)
Pigs (porkers and baconers)	180,704	(S. Aus., 4,361)
	Cwts.	
Chilled beef	381,693	(S. Aus., nil)
Frozen beef and veal	1,535,963	(S. Aus., 4,038)

Prevention of Blowfly Strike.

Replying to a question submitted from Robe, Mr. W. S. Smith (Veterinary Officer of the Stock and Brands Department) made the following statement:—"The Mules operation consists of removing the breech fold which runs down the hind legs of some sheep from the rump to just above the hock. The operation is done with a pair of roll-cut secateurs or a pair of hollow ground shears. Although a nasty gaping wound is left it heals in a comparatively short time, and is seldom struck by flies.

Sheep may be divided into three classes, viz.:—(1) The plain breeched type; (2) the medium type; and (3) the wrinkly breeched type. It has been definitely shown that the third type, *i.e.*, the wrinkly breeched sheep, is far more prone to fly-strike than the first type, *i.e.*, the plain breeched type. The reason is that the folds of the breech become soiled with urine, a skin irritation is set up and this becomes attractive to the blowflies.

Therefore, the removal of this fold as is done in the Mules operation prevents the accumulation of urine with its undesirable results and lessens the attractiveness of the sheep to the flies. Although the operation is practised by certain sheepowners, it is not yet widely used, but its use will, no doubt, extend considerably in the next few years.

In some experiments carried out, it was shown that the operation reduced the strike incidence very considerably in the wrinkly breeched type of ewe. The main argument against its extended use is the fact that intending buyers of plain breeched ewes may find that they have bought treated sheep, and that the subsequent progeny are wrinkled.

The disclaimers of the operation say that it is better to *breed* the plain breeched sheep. Whether it is possible to do this without loss of density is a sheepbreeder's problem.

To date, methods of preventing blowfly strike are only partially successful, *i.e.*, no method employed whether the Mules operation, crutching or jetting, is 100 per cent. effective.

The Mules operation, by removing the breech folds, is of permanent value, whereas crutching and jetting are only temporary measures, and have to be repeated from time to time.

Whether the spread of maggot infestation in sheep will be wholly prevented by further scientific discoveries cannot be forecast, but much of the losses incurred by sheepowners through this pest may be materially reduced by—(1) Breeding plain breeched sheep; or (2) adopting the Mules operation for wrinkly breeched sheep; (3) crutching; (4) jetting (5) reducing the fly population by means of traps.

Rainfall Table

The following figures, from data supplied by the Commonwealth Meteorological Department, show the rainfall of the subjoined stations for the month and to the end of April, 1938; also the average precipitation for April, and the average annual rainfall.

Station.	For April, 1938.	Av'ge. for April.	To end April, 1938.	Av'ge. Annual Rainfall.
FAR NORTH AND UPPER NORTH.				
Oodnadatta	—	0·22	3·52	4·60
Marree	—	0·37	2·95	5·78
Farina	0·03	0·43	3·26	6·30
Copley	0·07	0·55	2·61	7·72
Beltana	—	0·53	1·58	8·34
Blinman	0·23	0·79	2·61	11·64
Hookina	0·35	0·62	2·55	10·85
Hawker	0·74	0·86	2·85	12·04
Wilson	0·76	0·81	3·41	11·63
Gordon	0·40	0·50	3·04	10·25
Quorn	0·54	0·88	5·90	13·02
Port Augusta	0·29	0·75	3·44	9·38
Bruce	0·46	0·49	2·86	9·78
Hammond	0·61	0·82	2·88	11·02
Wilmington	0·71	1·33	4·51	17·17
Willowie	0·57	0·71	2·16	12·07
Melrose	1·49	1·63	6·99	22·79
Booleroo Centre	1·21	1·13	3·86	15·08
Port Germein	0·97	1·10	3·28	12·49
Wirrabara	2·47	1·44	6·01	19·13
Appila	2·10	1·14	5·54	14·55
Cradock	0·74	0·71	4·02	10·62
Carrieton	0·78	0·77	5·01	12·06
Johnburg	0·59	0·64	3·28	10·47
Eurelia	0·88	0·82	4·87	12·61
Orroroo	1·30	0 90	6·10	13·10
Nackara	0·56	0·58	2·35	11·09
Black Rock	1·21	0·84	3·70	12·24
Oodlawirra	0·80	0·70	3·72	11·37
Peterborough	1·07	0·91	3·67	13·14
Yongala	1·77	1·03	4·65	14·37
NORTH-EAST.				
Yunta	0·08	0·58	1·82	8·44
Waukaringa	0·03	0·51	2·28	7·85
Mannahill	0·22	0·53	1·20	8·06
Cockburn	0·04	0·59	0·36	7·85
Broken Hill	—	0·69	0·35	9·37
LOWER NORTH.				
Port Pirie	1·62	1·15	4·09	13·16
Port Broughton	2·11	1·17	5·35	13·82
Bute	3·26	1·23	5·61	15·36
Laura	3·23	1·46	6·03	17·88
Caltowie	2·34	1·25	5·80	16·65
Jamestown	2·21	1·24	6·38	17·63
Gladstone	2·51	1·34	5·88	16·24
Crystal Brook	2·75	1·24	8·28	15·72
Georgetown	1·88	1·50	6·20	18·17
Narridy	2·03	1·24	5·32	15·66
Red Hill	2·59	1·31	5·54	16·54
Spalding	1·73	1·01	5·24	18·51
Gulnare	1·97	1·10	5·57	18·37
Yacka	2·69	1·17	4·80	15·34
Koolunga	1·69	1·15	4·26	15·21
Snowtown	3·12	1·25	5·54	15·67
LOWER NORTH—*continued.*				
Brinkworth	2·74	0·92	4·34	15·60
Blyth	2·98	1·35	5·11	16·68
Clare	3·47	1·95	7·77	24·42
Mintaro	4·21	1·58	8·85	23·27
Watervale	4·71	2·22	9·12	26·66
Auburn	4·25	1·80	8·30	23·89
Hoyleton	3·61	1·48	6·70	17·27
Balaklava	2·91	1·39	4·67	15·34
Port Wakefield	2·05	1·14	3·48	12·90
Terowie	1·27	0·88	4·38	13·29
Whyte-Yarcowie	1·11	0·94	3·66	13·55
Hallett	1·86	1·13	5·86	16·37
Mount Bryan	2 74	0.95	6·57	16·74
Kooringa	2·76	1·20	6·52	17·75
Farrell's Flat	2·55	1·40	7·51	18·51
WEST OF MURRAY RANGE.				
Manoora	2·88	1·32	6·71	18·87
Saddleworth	3·91	1·62	7·91	19·58
Marrabel	3·55	1·60	7·52	19·90
Riverton	4·19	1·72	7·32	20·80
Tarlee	3·28	1·49	6·12	18·06
Stockport	4·15	1·34	6·96	17·04
Hamley Bridge	3·16	1·35	5·06	16·50
Kapunda	3·11	1·57	7·10	19·71
Freeling	3·66	1·39	6·36	17·73
Greenock	4·35	1·61	8·65	21·42
Truro	3·33	1·48	6·09	19·72
Stockwell	3·33	1·55	6·45	19·98
Nuriootpa	4·96	1·56	9·32	20·77
Angaston	4·24	1·66	8·68	22·29
Tanunda	3·90	1·70	6·95	21·94
Lyndoch	5·34	1·67	8 46	23·17
Williamstown	7·07	2·03	11·28	27·41
ADELAIDE PLAINS				
Owen	3·65	1·25	6·01	14·83
Mallala	3·68	1·34	5·57	16·39
Roseworthy	3·29	1·40	6·66	17·37
Gawler	4·78	1 55	7·30	18·81
Two Wells	2·87	1·36	4·46	15·75
Virginia	3·33	1·37	5·43	17·17
Smithfield	3·99	1·12	6·56	17·62
Salisbury	4·52	1·54	7·33	18·49
Adelaide	5·81	1·73	9·00	21·17
Glen Osmond	6·33	2·00	9·25	25·84
Magill	6·02	1·93	9·48	25·24
MOUNT LOFTY RANGES				
Teatree Gully	6·95	1·90	11·01	26·83
Stirling West	11·96	3·57	18·09	46·86
Uraidla	10·67	3·19	15·96	43·64
Clarendon	7·25	2·71	11·30	32·74
Happy Valley Res.	6·03	—	9·25	—
Morphett Vale	5·30	1·80	8·50	22·56
Noarlunga	6·13	1·63	10·08	20·35
Willunga	5·15	1·93	7·62	25·91
Aldinga	3·29	1·48	5·61	20·11

RAINFALL—*continued.*

Station.	For April, 1938.	Av'ge. for April.	To end April, 1938.	Av'ge. Annual Rain-fall.
MOUNT LOFTY RANGES—*continued.*				
Myponga	5·38	1·87	8·61	29·45
Inman Valley	3·77	—	6·60	—
Yankalilla	2·98	1·62	5·06	22·70
Mount Compass	5·72	2·55	8·98	36·32
Mount Pleasant	6·30	2·00	9·12	27·02
Birdwood	8·85	2·04	11·36	28·86
Gumeracha	9·52	2·43	12·83	33·12
Millbrook Reservoir	12·04	1·83	16·34	34·00
Lobethal	10·01	2·52	13·48	35·79
Woodside	7·44	2·18	10·67	32·01
Hahndorf	8·51	2·45	11·87	34·65
Nairne	5·10	2·08	7·80	28·04
Mount Barker	6·95	2·25	10·10	31·17
Echunga	7·85	2·54	11·78	33·25
Macclesfield	5·62	2·30	8·36	30·29
Meadows	8·07	2·81	12·04	35·93
Strathalbyn	3·15	1·42	5·42	19·35
MURRAY FLATS AND VALLEY.				
Meningie	3·44	1·45	6·48	18·28
Milang	2·54	1·22	4·81	14·85
Langhorne's Creek	1·95	1·16	4·14	14·99
Wellington	3·12	1·18	4·73	14·68
Tailem Bend	3·14	0·83	5·47	15·19
Murray Bridge	1·81	1·10	3·32	13·51
Callington	1·87	1·12	2·97	15·14
Mannum	1·58	1·01	3·26	11·51
Palmer	3·40	0·93	5·18	15·70
Sedan	1·70	0·87	3·42	11·99
Swan Reach	1·14	0·55	3·20	10·60
Blanchetown	0·61	1·01	2·61	10·97
Eudunda	2·12	1·33	6·36	17·16
Point Pass	2·33	1·04	5·63	16·93
Sutherlands	0·60	0·61	2·42	10·73
Morgan	0·36	0·62	1·90	9·12
Waikerie	0·45	0·54	1·76	9·71
Overland Corner	0·21	0·74	2·08	10·21
Loxton	0·61	0·50	2·52	11·34
Berri	0·60	0·53	2·79	10·11
Renmark	0·82	0·66	2·20	10·37
WEST OF SPENCER'S GULF.				
Eucla	1·07	1·06	2·07	10·06
Nullarbor	0·86	0·62	1·37	8·79
Fowler's Bay	0·96	0·85	2·52	11·89
Penong	1·46	0·82	4·33	12·22
Koonibba	1·67	0·71	7·41	12·16
Denial Bay	1·93	0·87	6·52	11·31
Ceduna	1·30	0·61	6·31	10·30
Smoky Bay	1·39	0·60	6·00	10·42
Wirrulla	1·85	0·57	9·33	10·71
Streaky Bay	1·09	0·97	6·63	14·85
Chandada	1·29	0·85	7·99	12·31
Minnipa	1·49	0·68	8·59	13·83
Kyancutta	1·54	0·90	6·15	13·16
Talia	1·60	0·64	1·06	14·50
Port Elliston	1·90	1·06	7·13	16·44
Lock	1·96	0·80	7·69	16·23
Mount Hope	3·11	—	6·92	—
Yeelanna	2·16	0·89	6·44	15·92
Cummins	2·45	0·85	7·00	17·47
Port Lincoln	2·50	1·42	6·61	19·27
Tumby	1·62	0·93	5·77	14·16
Ungarra	1·94	0·87	5·24	16·81
Port Neill	1·22	0·84	5·38	13·06
WEST OF SPENCER'S GULF—*continued.*				
Arno Bay	1·26	0·98	4·28	12·72
Rudall	1·65	0·92	5·53	12·94
Cleve	2·05	1·16	6·15	14·90
Cowell	0·69	1·12	2·73	11·06
Miltalie	0·86	1·18	4·96	13·72
Mangalo	0·96	0·89	4·35	13·80
Darke's Peak	1·57	0·80	5·10	15·08
Kimba	1·02	0·75	4·42	11·64
YORKE PENINSULA.				
Wallaroo	1·87	1·24	5·51	13·93
Kadina	2·70	1·31	6·34	15·53
Moonta	2·47	1·42	6·03	14·98
Paskeville	2·82	1·21	5·33	15·47
Maitland	4·88	1·67	9·03	19·76
Ardrossan	3·38	1·16	5·12	13·91
Port Victoria	3·26	1·28	6·23	15·33
Curramulka	3·22	1·25	5·02	17·72
Minlaton	4·57	1·36	6·82	17·65
Port Vincent	1·88	0·89	3·52	14·26
Brentwood	3·28	1·08	5·58	15·52
Stansbury	2·73	1·26	4·69	16·75
Warooka	2·76	1·31	5·77	17·38
Yorketown	2·81	1·28	5·16	16·81
Edithburgh	3·67	1·32	6·27	16·31
SOUTH AND SOUTH-EAST.				
Cape Borda	2·53	1·86	7·44	24·83
Kingscote	2·76	1·41	5·27	19·20
Penneshaw	3·37	1·33	5·17	19·09
Victor Harbour	3·93	1·63	6·66	21·37
Port Elliot	3·74	1·56	6·53	19·93
Goolwa	4·15	1·36	7·50	17·85
Maggea	0·70	0·71	2·65	10·32
Copeville	1·54	0·54	4·20	11·64
Claypans	1·44	0·62	3·13	10·77
Meribah	1·70	0·93	3·12	11·26
Alawoona	1·29	0·73	2·79	10·43
Caliph	1·65	0·92	3·11	10·60
Mindarie	1·99	0·59	3·45	12·16
Sandalwood	1·76	0·55	3·80	13·67
Karoonda	2·11	0·68	3·93	14·33
Pinnaroo	2·01	0·79	4·00	14·14
Parilla	3·12	0·83	5·53	13·67
Lameroo	2·89	1·02	5·60	15·79
Parrakie	2·87	0·75	4·52	14·58
Geranium	3·62	0·97	5·53	16·36
Peake	3·49	0·86	5·27	15·87
Cooke's Plains	3·77	1·11	6·31	15·33
Coomandook	4·10	1·02	6·13	17·01
Coonalpyn	4·14	1·36	6·36	17·65
Tintinara	4·26	1·32	6·44	18·68
Keith	3·45	1·16	6·46	17·95
Bordertown	2·40	1·53	5·76	19·16
Wolseley	2·06	1·50	5·01	18·50
Frances	2·54	1·45	6·97	20·18
Naracoorte	2·94	1·75	7·24	22·64
Penola	3·58	1·86	6·88	25·89
Lucindale	4·44	1·84	8·19	23·48
Kingston	3·46	1·84	5·26	24·24
Robe	2·97	1·77	4·50	24·63
Beachport	4·15	1·92	6·88	27·06
Millicent	5·35	2·37	9·99	29·93
Kalangadoo	5·36	2·15	10·67	32·00
Mount Gambier	4·00	2·33	8·42	30·29

Agricultural Bureau of South Australia

Reports Received from Branches

The following is a list of the Branch reports received during the month of April, and shows the date and principal subject of each meeting:—Allandale East, 8th April, "The Agricultural Bureau," R. T. Laslett. Apilla Yarrowie, 1st April, report on experimental plots, W. E. Lange. Balumbah, 6th April, discussion. Beetaloo Valley, 14th March, "Horses *v.* Tractor," P. Curtin; "Breaking Young Horses," A. Bartrum; 11th April, "Concrete Fencing Posts," W. J. Greig; "Pigs," E. Stephens. Berri, 21st March, "Cover Crops," Dr. W. E. Meier and Mr. O. Weste; 11th April, "Fruitgrowing in Queensland," O. E. Halliday. Blackheath, 14th April, paper from *Journal.* Black Springs, 5th April, address, Hon. W. G. Hawkins. Blewitt Springs, 12th April, Question Box. Blyth, 8th April, Seed Wheat Competition. Booleroo Centre, 25th March, formal. Brimpton Lake, 24th March, presentation of Crop Competition Trophy; 14th April, "Power on the Farm," A. Ashman. Brownlow, 11th April, address, E. L. Orchard. Bute, 1st April, "The Tractor on the Farm," H. E. Bettess. Charra, 12th March, "Manures," E. M. Borlase. Chilpuddie Rock, 16th March, paper from *Journal.* Coonalpyn, 23rd March, discussion; 20th April, "Seeding Preparations," G. H. Sutherland. Gladstone, 25th March, paper from *Journal.* Glencoe, 5th April, "Care of Horses' Feet," L. Williams. Goode, 13th April, paper from *Journal.* Hartley, 13th April, Annual Social. Hilltown, 5th April, discussion, "Seeding Operations." Ironbank, 8th April, "Agricultural Chemistry," E. Stephens. Kelly, 2nd April, visit by Pinkawillinie Branch. Keyneton, 13th April, address, E. L. Orchard. Kongorong, 11th April, re-organization of Branch. Kulkawirra, 5th April, "Barley Growing," R. A. Dodd. Kyancutta, 12th April, address, W. H. Brownrigg. Lameroo, 1st April, "Sheep Husbandry," R. A. Jenkins. Light's Pass, 11th April, address, J. B. Harris. Maltee, 21st April, "How to Make a Living on a 2,000-Acre Farm," D. Ferguson. Miltalie, 11th April, Question Box. Mount Barker, 21st March, "Pasture Interests," R. Hill. Mount Bryan, 23rd April, "Fodder Conservation," A. A. Jefferies. Mount Hope, 23rd March, "Farm Management," R. L. Myers. Murraminga, 9th April, Question Box. Murraytown, 12th March, "Care of Farm Implements," D. R. Deer; 9th April, "Noxious Weeds," E. L. Orchard. Myponga, 14th April, Field Day. Nantawarra, 14th April, "Experiments in Bleaching Wheat," J. A. Atkinson. Narridy, 2nd April, address, J. O. Hatter. Nunjikompita, 14th April, "Preparing for Shearing," F. May. Parrakie, 5th April, Annual Meeting. Paskeville, 12th April, discussion, Field Trial. Pinbong, 27th February, "Sheep Diseases," W. H. Brownrigg; 19th March, "Hints on Team Work," E. G. Jericho. Pygery, 13th April, Social, address, W. H. Brownrigg. Rosedale, 12th April, "Hobby Evening." South Kilkerran, 4th April, "Farm Buildings," L. Ames. Spalding, 13th March, address, W. J. Spafford; 14th April, "Preparation of Fallow," E. L. Orchard. Stockport, 24th January, Crop Competition Report; 18th February, Social. Sutherlands, 7th April, "The Agricultural Bureau," E. F. Boehm. Upper Wakefield, 14th April, "Diesel-engined Tractors," H. Gregor. Waddikee Rock, 5th March, "Tandem *v.* Abreast Teams," H. Grocke. Wallala, 19th March, Question Box. Wilmington, 4th April, "Development of Banking," T. Cornelius. Yadnarie, 13th April, "Fodder for Cows," A. J. Todd. Yurgo, 1st April, Annual Meeting.

Papers Read at Conferences

Wells and Pumps

[G. A. Downing, Kingston (Robe Conference).]

Shallow Wells.

Wells are technically know as "shallow" or "deep" wells. Although depth may have some classification, the question of the ground strata from and through which the water is drawn is of most importance. With the exception of such water as flows off the surface into rivers, streams, and lakes, all water deposited on the earth's surface by rainfall and not evaporated sinks into the ground, and, subject to the varying permeability of the soil and subsoil finds its way to varying depths in the earth and obeys the natural law of gravity by seeking a lower level. Thus occur what may be termed "underground streams," the depth of which is determined by the perviousness or imperviousness of the subsoil strata they have met in their passage through the earth's surface.

Water which has found its way through the easily permeable strata of the subsoil but has been arrested in its downward progress by the impervious stratum is drawn upon by what are termed "shallow wells." Such water, from its liability to pollution by the organic matter which it may have have taken up from the ground upon which it has fallen or through which it has percolated, is of doubtful quality for domestic purposes, and may even be dangerous to health if such pollution is excretal in origin.

Shallow well water can, therefore, never be advocated as a "safe" supply, but when its use is unavoidable, owing to the absence of any better supply, steps must be taken to obviate its pollution, and especially its pollution by organic matter of an excretal nature. No such well should be driven or sunk at a less distance than 150ft from any privy, urinal, sewage tank, cesspool, pigsty, stable, or cowbail. Neither should it be sunk in heavily manured country, particularly land polluted with nightsoil. All nightsoil should be carried in a direction away from such well.

Protection from surface washings should be afforded by covering the head of the well with a dome-shaped cover of cement concrete, provided with openings for the main pipe and access to clean the well. The sides should be protected by concrete or brick in mortar, with a backing of stiff clay. If any reasonable suspicion of the water is entertained, it should be boiled before use.

Pumps.

The size of a pump that a mill will drive depends upon the head against which it is working, and this point can be decided by the information supplied by the mill manufacturers. However, it must be clearly understood that, size for size, the different makes of mills will not drive the same size pump. This depends on the length of stroke and the number of strokes per minute that the mill was designed for; but, irrespective of the size of the pump, the daily output of two different makes of the same size would be about the same. The mill that would drive the larger pump would be working either a shorter stroke or less strokes per minute than the one driving a smaller pump. From this it will be seen that if contemplating replacing a mill with one of a different make, it would be as well to advise the agents concerning the size of pump installed, and send them a rough sketch of the proposition, showing the vertical height from the lowest water level to the highest point of delivery, together with the sizes and lengths of pipe lines in use. The siphon type of pump can only be used for surface work, its main recommendation being that it is self-priming.

The Centrifugal Pump.—The manner in which a centrifugal pump operates is entirely different from that of a displacement type of pump, and pumping problems involving the use of centrifugal pumps must be dealt with on an entirely different basis. The suction lift should seldom exceed 15ft. and never exceed 20ft. at sea level. The footvalve should be at least 3ft. under the water to prevent air being drawn into the pump through the "whirlpool," which would occur if the valve were nearer the surface.

Priming of the Centrifugal Pump.—Priming is, of course, only necessary in the event of a footvalve leaking. By providing a suitable small water storage tank above the tank level a centrifugal pump may be made self-priming, a feature particularly desirable when the operation of the pump must be automatic. Centrifugal pumps should never be operated when empty.

The Woollen Industry

[R. B. Vine, Kingston (Robe Conference).]

It is estimated that there are over 570 million sheep in the world. It must be remembered that in one of the principal sheep-producing countries, Australia, the number has varied largely from time to time owing to drought. In 1890 the number was 98 millions; in 1902 only 54 millions; in 1911 there were 93 millions; and in 1925 over 103 millions.

Just as man by careful selecting and breeding has produced hens which lay several hundred eggs a year in place of a few laid by the original jungle fowl of India, from which our hens are descended, so he has carefully selected sheep with the best fleeces and has gradually produced a race of animals that now yield on an average nearly twice as much wool as sheep yielded 40 years ago. All sheep do not yield the same quality of wool, and even the same kind of sheep will produce better wool in one country than in another. The difference is due to climate and soil. Sheep reared in Australia produce a finer wool than the same kind of sheep brought up in England.

Australia possesses more sheep than any other country excepting the Argentine, but we produce more than half as much wool again as the whole South American continent. Some 5 per cent. of the total clip is used by Australian mills, and 16 per cent. is scoured and washed before export. The United Kingdom is our chief customer.

The first woollen factory in Britain was started by the Romans at Winchester in the year 80, for the making of warm garments for their soldiers. England's prosperity in the Middle Ages was largely built up on wool, as sheep farming was the principal national industry. The wool was exported to Flanders. Later Flemish weavers came to England and woollen manufactures grew, encouraged by our kings as a source of revenue. Edward III. prohibited the export of wool from England and he also forbade the importation of fine woollen cloths from Flanders.

Wool is woven into two distinct kinds of cloth, one called woollen cloth and the other worsted. The woollen cloth is closer in texture and warmer; and worsted is finer and more handsome in appearance. When the wool reaches the mill it is washed free from grease and other impurities with potash soap. It is then dried. Another machine, known as a willowing machine, then opens out the wool and separates the various locks. Then the wool is passed through a carding machine, which consists of a number of leather-covered rollers with wire teeth which separate and re-arrange the fibres. Next the fibres are spun into yarn. The process of warping is then carried out. Every piece of cloth has two sets of thread, one running lengthwise, called the warp, and the other crosing these and called the weft. The threads which form the warp and the weft are woven into cloth on a loom using a flying shuttle.

The manufacture of woollen and tweeds was established under Government control in New South Wales in

1801, when blankets were made by convicts. There are over 50 woollen and tweed mills in Australia. A woollen garment will keep us cool in summer as well as warm in winter; for just as it prevents the heat of the body passing out, it prevents the heat of the sun and air passing in. That is why the ice merchant used to send his ice through the streets wrapped in a blanket.

Tree Planting on the Farm

[A. D. ADAMSON, Penola (Robe Conference).]

In travelling through any part of the South-East, one is amazed at the wholesale destruction which has taken place in so much of the native timber, particularly the Red Gums which lend such charm to an otherwise flat and uninteresting landscape. In the process of settlement and development, the destruction of timber is inevitable, but in many instances no common sense or forethought appears to find a place once the axe is brought into play; and the value of timber for shade and shelter purposes, besides being a joy to the eye is entirely lost sight of. District Councils are not blameless in this respect, and much of the roadside timber might have been retained had its value been fully realised.

There is evidence of a considerable amount of planting having been done by some of the early settlers, but unfortunately this important work was not followed up to any extent by subsequent generations, regardless of the fact that for many years trees were supplied gratis to landholders from the various Government nurseries.

In a district with good soil and abundant rainfall, there is the choice of a very wide range of trees. Most of the Eucalypts and Conifers, besides many deciduous trees, grow to perfection, and it is merely a matter of selection for the purpose required.

For breakwinds and general shelter purposes the Conifers take pride of place, and undoubtedly the most deservedly popular of these are the *Pinus Radiata* and *Cupressus Lambertiana Hor.* The former will not thrive on low-lying land, whereas the latter will do very well under wet conditions, and is admirably suited to the bulk of the black plain country. The ease with which this can be grown and controlled makes it ideal for the general planting, and it is probably the most widely grown for hedge purposes, its only drawback being that the plants, which are propagated from cuttings in a nursery are rather expensive, costing about 3s. 6d. The seedling *Macrocarpa* is unsatisfactory for hedges, as it shows a wide variation in type, and some of the plants have a nasty habit of dying out after a few years, leaving unsightly gaps in the hedges.

In localities where stone is close to the surface, the Stone Pine will be found satisfactory, and although slower of growth than *Radiata*, it is an excellent shelter tree. Of the Conifers the three aforementioned are the best for general planting.

The Eucalypts.

The Sugar Gum has been very popular in the past, one great point in its favour being rapidity in growth, also its adaptability to almost any soil or climate, but apart from these desirable characteristics, there is little else to commend it, as it almost invariably sheds the lower limbs and becomes of little use as a shelter tree. However, there is a dwarf variety, and on present appearances these trees show great promise. Planted about 5 years ago, they evidence no signs of lankiness, and have retained a dense growth right to the ground.

The Mahogany Gum (*E. botrioides*) is also worthy of a trial; but it is not satisfactory in wet country.

For planting near the homestead I favour the flowering gums, most of which are very hardy and present a magnificent appearance when in bloom; the two outstanding ones are *E. calophylla rosea* and *E. ficifolia;* the former is of fairly quick growth and makes a fine symmetrical tree of about 20ft. in height; the flowers are rosy pink and borne in dense masses. *E. ficifolia* makes slower growth and does not attain the height of *calophylla* and has a more irregular appearance; its flowers vary from a rich crimson to orange scarlet, and it is certainly one of the most striking of the flowering gums. Most of these trees were introduced from Western Australia, and some have not proved suitable for South-Eastern conditions, amongst these being *E. torquata* (Coolgardie Desert Gum). Other flowering gums well worth growing are *E. Stricklandii,* a handsome handsome tree bearing yellow blossoms, *E. angulosa,* a dwarf variety, and *E. macrocarpa* which, although not of a very ornamental nature, has immense blooms. *E. citriodora,* the lemon scented gum, is a very stately tree and should be included in every collection.

Other Hardy Ornamental Trees.

The Acacias, are of great value in all tree planting schemes. This family attains over 300 varieties indigenous to Australia, and by judicious planting it is possible to make a selection from the best, four of which are *Baileyana* (Cootamundra), *Pycnantha* (Golden), *Elata* (Cedar Wattle), and *Podalyrafolia* (Queensland Silver). The Acacias are not generally considered to be long lived, but by systematic pruning *A. Baileyana* can be made to last for many years; cut hard back each alternate season after blooming.

The *Sterculias* are highly ornamental trees, and in this group the Kurrajong and Flame tree are most generally grown. Coming from a warmer climate than our own, their growth is slow, but nevertheless they should be much more extensively grown. The Flame tree is one of the most showy trees in existence, but unfortunately there are very few specimens in the South-East.

Of the Cypress family, some of the most noteworthy from an ornamental point of view are *C. lambertiana, aurea* (Golden Cypress), *torulosa and sempervirens,* and space should be found for these in all plantations.

Hedges.

Here again selection is not limited. Coprosma is an excellent, fast-growing hedge which never looks shabby. A great many of the flowering shrubs may be planted as hedges and are very effective in this form: *Ceanothus* (blue), *Plumbago capensis* (blue), *Tecoma capensis* (orange) and the Lantanas, which are free flowering throughout summer and autumn. For planting around fowl runs, &c., the Yellow Flowered Tree Lucerne is excellent and makes a grand show during October.

Care of Young Trees and Shrubs.

The Cypresses and most of the flowering gums are very subject to attacks from Curculio Beetle, and this spells ruin to young trees during their first couple of years of growth; the remedy is repeated sprayings with arsenate of lead. Watering is also important during the first summer or two, but after that the young tree will be able to fend for itself; the rainfall generally being sufficient. Adequate provision in the way of fencing is also most necessary, and failing this, it is useless to expect results. All landowners should attempt a little in the way of planting each year, and they will be amply repaid in the pleasure which always accompanies the watching of growing things. Most trees are easily raised from seed, and well grown plants are procurable in pots from the various nurseries and the Forests Department at a cost of about 1s. to 1s. 6d. each.

The coming month is a good one for planting, and the trees will be well established before winter sets in. However, spring planting is preferred by some, and may be carried out with almost equal chance of success.

Possibilities of Land in and around the Coast in the South-East

[G. ANGUS THOMSON, Kingston (Robe Conference).]

If one requires a good guide as to the possibilities of the South-East, let him follow the findings of the South-Eastern Commission. It should especially be a guide to buyers. That the coast is valuable, a good example is given in the fairness of the country on the coast side of the road from Kingston to Wangolina.

There is a possibility of buyers from other parts of the State retarding the development of the South-East. Not that they will tackle the development of the land unscientifically, but that there are some who will run short of capital in the undertaking. There is no possibility of getting a comparatively bumper crop on virgin soil in these parts. Pasture requires time to be established; a point that has too little been observed in this State. The most desirable aid that the Government can give settlers is through the Department of Agriculture; not through Banks or Assistance Boards. Herein one is not speaking deprecatingly of these Institutions.

The most desirable way to develop these lands is for it to be done through land boards or companies. Let, say, a dozen men with capital buy a huge tract of country, one plant used by a manager to gradually bring to bearing, so that when developed, it will offer a more pleasing prospect to buyers and give them cause to feel that they can produce considerable sheep, wool, mutton, cattle, beef or milk, as well as perform further developmental work.

In the past the South-East possessed many small flockowners, who moved their sheep from pasture to pasture. There are many who have not grasped the fact that farming is a livelihood and not a gold mine. Money is quickly made from the land only by wise buying and selling. Let big capital do that and make the South-East habitable, and it may be found that it can support smaller producers on smaller tracts of country.

The question will be asked "What about the small man?" If the small man wants to wrestle with the wild, virgin country and make it a smiling countryside, and wishes to do it with his limited amount of capital, let him do it with bullocks. The country is too rough for anything else. Poddy calves are easily obtained, and the rough country will grow rye. Crops or fodders worth while establishing are Couch grass, Buffalo grass; bamboo on bad sandy patches; perhaps lucerne of the Chinese and Hairy Peruvian varieties. Lucerne should be established not with Algerian oats but with an oat variety which affords cover only. Lucerne has never been given a fair trial in these parts. In the lighter soil I suggest Couch and Buffalo, because the less lighter soils are disturbed the better.

Breaking Up and Laying Down to Pasture, Heath Country in the South-East

[N. F. HAYES, Robe (Robe Conference).]

The first consideration is the choice of plant. For this class of work a horse team is unsuitable, as the rough country and continuous jerking knocks the horses about too much. In the choice of a tractor much depends on the class of country to be worked. Where there is no stone near the surface, the wheel type is the cheapest, both in initial cost and upkeep. However, if there is stone on or near the surface, a lot of trouble will be experienced with loose lugs and extension rims.

Pneumatic tyres were tried, but proved quite unsuitable, as they will not grip on yaccas and bushes. On the front wheels they are quite satisfactory, and make for easier steering and more comfortable driving.

The respective merits of crude oil and kerosene tractors need hardly be taken into consideration. There are several hundred pounds difference in the price, and there is not a great deal of difference in the price of kerosene and crude oil, so that a good many thousands of gallons of fuel would have to be burnt before the extra cost would be saved.

Next comes the choice of a suitable plough. Unfortunately there does not seem to be a plough on the market that is perfect for this work, although a couple of makes do quite good work. It is necessary to use a disc plough with 2 rear wheels; the single wheel does not give sufficient grip to hold the plough in the furrow over big yaccas, etc. A big plough of 6 or 7 discs will do better work than a smaller one of 3 or 4, due chiefly to the extra weight.

The vertical spring type of stump jump gives the best results, but the springs must not be screwed down too tightly where there is rocky country, as it damages the discs. It is advisable to have the disc bearings fitted with car-type grease nipples, as the oilers and grease nipples usually fitted are not satisfactory. It is necessary to spend a lot of time on the plough, particularly in the first year, as bolts, &c., are inclined to work loose. The disc bearings should be lubricated at least twice a day with a good grade of heavy oil, as there is a tremendous pressure on these bearings. If it is possible to have an expert start the plough, this should be done, as half the battle is in having the plough correctly set for the particular class of work. Some manufacturers make the beam of the plough with extra holes in it so that one disc may be taken off and the remaining discs spread out to give more clearance between the discs, enabling stumps, roots, etc., more easily to pass between them.

Unless absolutely necessary, the full number of discs should be left on; taking one off reduces the weight of plough, and the increased width of cut of the remaining discs leaves the ground in a rougher condition.

It has been stated that the breaking up, fencing and laying down to pasture of heath country costs £4 to £5 an acre. It is impossible to give the exact cost per acre; so much depends on the size of the plant, wages, &c., but the following costs are based on a 17/27 h.p. wheel-type kerosene tractor and a 4-disc plough—this being about a 10-horse job.

Kerosene—

Ploughing ..	2 galls. per acre.
Cultivating ..	¾gall. per acre.
Drilling	½ gall. per acre.
	3¼galls.

	s.	d.
3¼galls. at 1s. 2d. =	3	10
Oil at 5s. 6d. gall. =	0	8
	4	6 per acre.

	s.	d.
Wages at 8s. per day	3	0
Super, 1cwt. at £4 per ton	4	0
Oats for cover crop, 1bush. at 2s. 6d.	2	6
Sub. clover, 2lbs. at 1s. 4d.	2	8
Wimmera Rye grass with a little Perennial —4lbs.	1	4
Total, per acre ..	18	0

The paper makes no attempt to give any exact figures as to the cost of fencing, for so much depends on the size of the block being fenced, the type of fence, cost of labour and materials. The cost of materials for a rabbit-proof fence of 36in. netting, 17 gauge, A grade, with 2 No. 10 wires, 1 No. 8 and barb on top is about £52 per mile, plus cost of posts and labour, so that a 640 acre paddock fenced on 4 sides would cost £208 or 6s. 6d. per acre. Added to the previous 18s., this brings the figure to 24s. 6d. per acre, so it is hard to imagine how £4 or £5 could be spent. Depreciation on plant has not been taken into account, as cost per acre would depend on acreage worked per year. On a £500 plant depreciation at 10 per cent. would be 5s. per acre, if 200 acres per year were done.

Burning the country before ploughing makes for an easier and cleaner job. Plough just deeply enough to cut off yaccas above the roots. Deeper ploughing makes heavier work and turns up the poor subsoil.

If ploughing is done at a slow speed, with the plough correctly set, not more than 10 per cent. of growth will be left. The remaining 10 per cent. will probably be killed by stock in a few years. Many people work the land down to a fine tilth. This is costly and unnecessary. Pasture grasses sown on comparatively rough ground suffer less from frosts and winds than those sown on a "garden-bed" surface. If the ground that has been ploughed is left fallow throughout the summer, broken down with a disc cultivator in autumn and then seeded with a piece of 4in. x 2in. hardwood dragged behind the drill, the result will be all that is required for pasture.

In drilling pasture seeds, it is important to just cover the seed. Seed sown too deeply will not germinate. Whether the crop is fed off or not does not greatly matter, but it is essential that stock be kept off it long enough for the grasses to seed; otherwise they will naturally decrease instead of increasing and covering the ground with good pasture.

The Fat Lamb Farm

[W. L. Barrows, Mount Gambier (Robe Conference).]

Pastures.

To produce fat lambs for the export market it is absolutely essential first of all to have suitable country, that is, country which has an abundance of rich food available for the ewe both before and after she lambs, so that the lamb will receive no setback from the day it is dropped until it is marketed. If the country will not do this it is necessary to sow pastures which will give these results.

In the greater portion of the South-East a mixture of Subterranean Clover and Wimmera Rye grass will be found to be most satisfactory, but there are large areas where *Phalaris tuberosa*, Perennial Rye grass, White Clover or Strawberry Clover could be grown almost to perfection; but whichever of these grasses and clovers are sown, their usefulness will be governed by the amount of superphosphate they receive.

It is most important to top-dress all of the pasture each year. By so doing, the carrying capacity will be increased considerably, and the pasture will be much more palatable and nutritious.

Top-dressing natural pasture will increase the carrying capacity considerably but will not be nearly as satisfactory for fattening the export lamb. Subterranean Clover is most important to fatten a lamb and to give it the bloom so desirable to the export lamb buyer.

Subdivision.

To keep the flock healthy and to provide a continuous supply of succulent feed it is necessary to subdivide the property into a number of paddocks so that the flock can be moved frequently on to fresh pastures. This also helps to prevent the pastures becoming heavily infected with worms and footrot germs.

In subdividing no set acreage can be given as to the correct-sized paddocks. That must be ruled to a large extent by the size of the property; with that idea in mind the property could be divided into 20 paddocks whether it contains 200 or 2,000 acres.

The Breeding Ewe.

With the property ready for the fat lamb the next step will be to procure suitable ewes. It is most important to procure a large-framed, robust ewe, such as the long-wool Border Leicester Merino. Such a ewe will provide a plentiful supply of milk for her lamb and will also cut a payable fleece; she is more prolific and is able to stand wetter and colder conditions than the Merino, and also will produce better shaped lambs, which she can fatten more quicky than the Merino. However it is very difficult to obtain suitable ewes, and most of us have to be content with a very mixed lot, because it does not pay the man who owns only fat lamb country to breed his own ewes.

This is a serious gap in our fat lamb industry. Men who own land in the lower South-East which is not suitable for fat lamb raising should be breeding the ewes for the fat lamb breeder, instead of running Merinos for wool alone. In this we lag far behind New Zealand, where the man on the hill country breeds the ewe for the fat lamb raiser on the plains. This is of great benefit to both, as the hill country man has a certain market for his lambs, and the fat lamb breeder knows where he can buy the right type of ewe for his job.

The Ram.

Not any one breed can be recommended to the exclusion of all others, for whilst one breed might be outstanding in one district, it may be quite unsuitable in another. The Southdown is the ideal type of lamb for the export market, but it must be sold off the mother, as it is unsuitable to carry over and also is slow to mature. The Ryeland, Shropshire, Dorset Horn, Border Leicester and English Leicester rams will all sire lambs suitable for export.

Whichever the choice is, see that a well developed, wide, deep and lengthy framed, pure bred ram is procured, as he will sire far better lambs than a nondescript animal.

Management of the Flock.

It is a good practice to drench all the ewes before joining the rams, so that they start the season free from internal parasites. Should the property have shown any evidence of footrot, every sheep must have its feet pared, and whether showing footrot or not, must stand in a foot-bath of foralin or blustone for at least one hour; although a sheep may be showing no sign of footrot it may be a carrier of the germ, and reinfect the whole flock. The sheep should go from the bath on to fresh pastures, and they should not be placed in any paddock unless it has held no footrot infected sheep for at least one month.

Crutch ewes and remove the wool above the teats about six weeks before lambing, and at the same time drench all sheep with bluestone-nicotine mixture; and repeat the dose a week later, so that the ewe will have no setback while rearing her lamb.

Rotational Grazing.

As soon as the grass begins to grow, make one big flock of all the breeding ewes and move them frequently to fresh pastures. When lambing commences, each time the ewes are moved, leave those with lambs behind, until there is sufficient for a flock. This proceedure makes it easier to watch the ewes yet to lamb, and in this way you quickly have a convenient sized flock of ewes and lambs, which will allow the lambs to be marked at the best age, that is when about a fortnight old, and they can safely be done when three days old.

When the flock is yarded for marking is an opportunity to drench the ewes, and it is most important that it is done. The ewe has a very big job to perform in growing wool and rearing her lamb, so she must be free from internal parasites; she cannot stand up to the drain of both the lamb and worms at the same time, and would quickly lose condition, become anaemic and produce insufficient milk for her lamb, so that it is most important that the ewes be drenched when the lambs are marked.

The pastures necessary to rear fat lambs seem also to be most suitable for the development of Entero-Toxaemia, and the young lamb in good condition appears to be most susceptible to the disease, which in some seasons causes a very heavy mortality and which is not curable; but inoculation as a preventive has proved very effective, and all of the lambs in the flock should be inoculated as young as possible. The incidence of the disease has been reduced by feeding hay, or by driving the sheep about every day, but the most satisfactory method is to inoculate.

In the spring it will be found that grass will be growing too fast to be eaten by the sheep, and as sheep do so much better on short feed, it will be necessary to leave two or three of the paddocks ungrazed, and rotate the sheep on the rest of the property.

The paddocks which are closed up are cut for grass hay, and the fodder thus conserved will be one of the most important factors in raising the carrying capacity of the property, for this is limited to the highest number of stock which can be carried during the lean period of the year, and by having a plentiful supply of grass hay on hand, considerably more stock can be carried through this period.

Lambs should be marketed straight off the mother, when about 80lbs. live weight, and care must be taken to avoid bruising, as a lamb is easily bruised if lifted by the wool or pushed into the trucks with sticks.

To sum up:—Use the large-framed, crossbred ewe; purchase only pure bred rams; top-dress all of the pasture very year; keep flock on succulent feed; subdivide, so that stock can be moved to fresh pastures; treat all sheep for footrot in the summer; crutch and drench ewes twice about six weeks before lambing; mark lambs when not more than three weeks of age; inoculate lambs against pulpy kidney; conserve all surplus fodder; market lambs when not more than 80lbs. live weight.

Papers Read at Branch Meetings

Paints and Painting.

In the course of a paper read at a meeting of the Green Patch Branch Mr. T. Carey stated:—All paints have three essentials—(1) vehicle, oil; (2) filler; (3) colour. There are two classes of paint—(1) lead paint, linseed oil and lead; (2) synthetic paint, becoming more popular. Ready-mixed paint, being under the supervision of experts, is recommended. Linseed oil paint varies in quality, the filler deteriorating from lead to zinc and lithopane, and finally in very cheap paints to french chalk. Colours are not permanent in the brighter shades. Stone colours, which are earth colours, such as ochre and clay, are permanent and are recommended for outside woodwork. Metallic oxide is used for brighter colours. These colours change shade when burnt and fade much quicker under exposure. Cheap paints are made up largely of reject materials, therefore being of little preservative value to woodwork.

Synthetic paint is quickly taking the place of linseed oil paint and synthetic oil in favour of vegetable oil. The synthetic resin is a chemical product, and will stand the weather and last far longer than linseed oil paint.

Interior Painting.—Flat paint, which is largely used, has the same constituents in different proportions. More thinning qualities are used. It has less lead, and therefore lacks durability. Flat paint is more levelling on rough timber and hides blemishes where a gloss would accentuate them. Less shine being easier on the eyes where it catches the light, flat paint is becoming more popular for inside work.

Staining.—Staining good timber brings out the grain and shows it off to better advantage. Stained wood does not show marks so readily as paint. Advantages of staining are: (1) more lasting; (2) less upkeep; (3) more pleasing.

Painting.—(1) The film of paint should be no harder than the film or surface to which it is applied. (2) A dry surface is essential. (3) Red lead and oil make a very hard foundation. (4) When beginning a painting job follow good advice. A tradesman is recommended, but an amateur can do a first-class job if care is taken and instructions adhered to.

Painting Walls.—A good, clean, even surface should be obtained. There are two methods of preparing walls for paint: (1) Remove smoke stains and dirt. To remove, paint a coat of hot lime and water on the walls, then scrape off. A weak coat of glue size to follow makes an excellent surface. (2) Seal: Glue size is used to seal up walls and equalise plaster suction. This has to be used with care, as it is very susceptible to moisture, which will crack it. Flat oil paint should be used for walls if paint is decided upon, and special drying oils are obtainable. These drying oils dry in from two to three hours, whereas it takes linseed oil 24 hours or more.

Kalsomine is recommended for walls, as it is more pleasing and less expensive than paint. Kalsomine covers unevenness in walls, whereas paint accentuates it. Colour will mix readily with kalsomine. Walls can be cleaned with turpentine for this preparation.

Where it is desirous to paint over stained wood a good coat of varnish will prepare it. To stain over painted wood it is necessary (where practicable) to scrape the paint off; where not practicable apply a coat of paint as near as possible to the original colour of the wood, and then stain over that.

Furniture.—French polish, which has a large portion of shellac, is one of the best known polishes. Modern polish is put on over a coat of lacquer, and car polish can be used over lacquer also. Turpentine may be used to clean the surface where no lacquer is present.

Outside Ironwork.—Appearance is to be considered where painting roofs, &c. For iron, a paint made of oxide of iron should be used. Bituminous paint is serviceable, cheap, and very effective as an undercoat. This, with a coat of aluminium paint to follow, is considered most satisfactory. Aluminium paint is obtainable in many different shades.

Painting Cars.—The approximate cost, if done by hand, is 22s. compared with £7 or £8 for a garage job.

Procedure.—(1) Prepare surface. To do this all rust, grease and wax should be removed. (2) To remove grease and wax apply a coat of soft soap and leave for 20min. before wiping off. (3) Straighten out dents and putty up blemishes. After the final coat of paint has been allowed to dry rub over with rubbing compound, which smooths the surface.

Harvest Reports.

Harvest reports are a popular feature of Branch meetings at this time of the year. The following extracts from recent monthly reports are published in the hope that they may be of interest and value to members of other Branches:—

Weavers.—Mr. E. H. Giles reported: "The year 1937 from the point of view of the weather was in several respects unusual. The result was a heavy and sappy growth of crops, particularly wheat. Spring rains held off until November 27, when rain fell almost every day for a fortnight, the sun seldom shone, there was no wind, and conditions were humid. Most of the barley had been reaped, but a percentage of stained grain was unavoidable. As a result, growers had to submit to a dockage from the majority of buyers. A falling market for barley undoubtedly assisted in bringing this about. Standing wheat was considerably bleached, and consequently weighed very light. The weight per bushel for f.a.q. wheat was fixed at 60¼lbs. The average returns for both wheat and barley have been good. If the dry October-November prevented the high yields which might have been expected, at the same time it prevented the possibility of rust which did considerable damage in some of the best districts of the State. We reaped the heaviest barley average we have had up to date (39 bushels), but wheat average went back to 8 bags. Ranee again gave best results throughout the district."

Mr. W. G. Agnew reported that crops were mostly on rough and new ground. Bobbin was the best wheat, yielding 9 bags. It gave better results than Ranee, and was a fortnight earlier than other varieties. Bencubbin was a good crop; Sword did not yield as well as was expected. Barley crops were very good, although some broke off badly. The average was 9 bags. Cultivated grass land yielded 2 bags better than ploughed-up grass land. Peas again did exceptionally well on sandy soil. Sheep and lambs were turned on them. Lucerne did remarkably well. Mr. H. Giles reaped his barley before the rain; the average was 7-8 bags. Nabawa wheat broke off badly; King's White was easily the best, yielding 9 bags. Sword, Ranee and Waratah returned 6 bags. Mr. A. J. Cornish's wheat suffered from dry weather, averaging about 8 bags. English barley was best on stubble (8 bags); Cape barley was a very poor sample. Ranee wheat yielded better than Sword. Mr. K. H. Giles reported that the barley was the cleanest they had grown, but some was lost with the wind. Sword was disappointing; Baringa was badly pinched; Dundee stood up remarkably well; Waratah on poor ground returned 8 bags. The wheat average was just over 8 bags. Mr. A. E. Anderson stated that where peas were grown barley was very good, but where no peas had been grown barley was a very poor crop. Crops were rather dirty and contained much wild oats.

Miltalie.—Mr. D. P. Bagnell reported that 760 acres averaged 12bush. Sword variety did not yield up to expectations. Wheat sown on stubble land was badly affected by eel worn and later with blow smut. The adjoining fallow showed very little effect of either; Waratah was affected more than Aussie. Mr. J. P. Story's crops averaged 17bush. He very strongly advocated working back fallow with a disc plough for the first time to give a loose mulch on the top. Sword was the best variety, averaging 21bush.; Dundee also yielded well; Ranee yielded lighter in comparison to the other wheats, and appeared to give best results from old land. He strongly recommended Ceresan for pickling to prevent smut, &c.; it was the only pickle which had prevented smut in his barley. Mr. H. L. Ramsey reported that Ranee yielded 12bush. Gluyas was the best variety, yielding 15bush.; Nabawa also yielded well; Sword was lighter in yield and contained a fair amount of ball smut. Mr. W. G. Smith did not favour Sword: Ranee did much better. Most members who had had experience with Ranee 4H considered that the old Ranee yielded better. Mr. Smith reported having tried a bag of New Zealand Cape oats. It stood feeding off better than other varieties, but he strongly favoured Guyra for hay. Mr. L. J. Jackson did not favour sowing lucerne late. Lucerne he had sown as a cover crop through his wheat, which was almost through the stooling stage, had all died away. His best-worked fallow had given best results, but one well-worked paddock was disappointing.

Murraytown.—Members reported that the most noticeable feature was that those farmers from the best parts of the district had received the lowest yields, owing to the severe October weather. Mr. F. J. Tregenza reported crop yields far below average. Mr. D. R. Deer reported that it had been a difficult seeding time. Red rust took a heavy toll in November. Baringa wheat yielded 21bush. on fallow and 24 on stubble. All returns were much lower than crops appeared likely to yield. Mr. C. J. Woolford reported Ranee 4H yielded 10 bags, Ranee 11 bags, Ford 11 bags. He favoured the old type Ranee. Mr. W. Joppich reported that Ranee did not yield up to expectations, returning 5-7 bags; Dundee, a big bulky crop, yielded 8 bags; Sword 6 bags.

Messrs. N. & A. Scholz reaped 10 bags from Ghurka, Dundee 8 bags, Ranee 7 bags, Teagle 8 to 9 bags, Free Gallipoli 5 bags, Baringa 5 bags. The wheat average was 22bush. Mr. Pitman stated that the season had finished badly, all wheat being too ripe to receive any benefit from the November rains. Wheat yields from a small area sown early in May were excellent, Ranee yielding 44bush., Marshall's No. 3 10 bags. June sown wheat was much lower in yield. The farm average was 7½ bags, Dundee again being a little below Ranee. Peas could not be reaped owing to the December rains.

Upper Wakefield.—Mr. J. Ryan reported that Sword had given the heaviest yield, Dundee following; 58-65lbs. seed and 150lbs. super were sown per acre. Mr. B. Cleary reported highest yield from Dan variety, followed by Dundee. Sword lodged badly. Malting barley was a fine, plump sample. Mr. H. Gregor reported Dundee as the highest yielding variety. Baringa was affected by unfavourable weather conditions.

Kilkerran.—Varieties grown by members were Dundee, Ranee 4H, Sword, Ford, and Bencubbin. Reports were rather conflicting; while with some members Ranee 4H was the better, with others Sword and Dundee proved superior and Ranee 4H was their last choice. One member reported having experimented with Ceresan and formalin for pickling barley. The Ceresan pickled came away faster than the formalin pickled barley, and at one stage in early spring it was quite 6in. taller. However, at harvest time there was no perceptible difference in the yield, but the Ceresan pickled was classed as A grade by the maltsters, and the formalin pickled was classed as B grade. Several members reported that Ford wheat suffered severely during the hot, dry spell in early October, and produced a pinched sample.

Frayville.—Mr. H. Rozenzweig reported the best crop for years, with a farm average of over 5 bags; Ranee was the best, giving 7 bags, while Nabawa was a close second. Mr. G. Quast reported very poor crops throughout, due to ravages of the eel worm. Mr. O. E. Rosenzweig stated that oats were poor, Palestine being the only variety worth while for the season. Barley on stubble produced 4 to 5 bags average; wheat yielded up to 21bush. with Aussie and Waratah the best. Mr. A. J. Helbig's average for the season was 5 bags, all varieties sown yielding about equal. Mr. H. Krause reported an 8-bag average; Sword yielding 10 bags, Dundee 9 bags, Ranee 6-8 bags. Mr. V. Wegener received a return of 5 bags from Mulga oats; Algerian were a total failure. Cape barley 5-6 bags, Pryor 5-6 bags, Ranee wheat 6 bags, Currawa 4 bags (badly blighted), Dundee 4 bags. Mr. H. B. Scheer reported Ranee 13bush,, Sword 11bush., Currawa 11bush.; average 12bush. Oats were a failure. Mr. S. A. Bretag had very uneven crops throughout, with an average from 15bush. to 16bush.; Dundee 7 bags, Nabawa and Ranee 6 bags. Sword was not up to average.

Balumbah.—Mr. S. L. Wohling reported that wheat sown dry had yielded best. A crop sown by Mr. W. H. Riches had yielded 3 or 4 bags per acre better than the same wheat sown on similar ground a fortnight later. Mr. L. Stutley stated that a paddock worked back with a disc plough before seeding had yielded well, but a small piece in the centre, which he did not work, was badly affected with take-all. The general opinion of members was that more super should be sown on sand in order to give the crop a good start and to assist growth during the winter.

Beetaloo Valley.—Although yields were reduced in some instances owing to damage by rain, many good crops were reaped. Dundee yielded the best in several cases, other good yields being from Ranee, Bencubbin, Bobbin, S.H.J., Currawa, Ghurka, and Waratah. Hay yields ranged from 30-50cwts.

Appila.—Returns received by members were (in bushels):—Dundee 16-33, Ranee 14-31, King's Early 24-30, Leatherhead 21, Nabawa 13-21, Early African 24-30, Baringa 19-32, Turvey 27, Ghurka 16-30, Sword 16-33, Fondling 11, Carrabin 7-15, Waratah 16-24, German Wonder 16, Bencubbin 24, Sultan 15-24, Minister 21, Baldmin 27-33, S.H.J. 30-31, Cape barley 24-48, Early Burt oats 18-50, Guyra 30, Early Kherson 33-41.

Pinnaroo.

[A. O. Nietz (Pinnaroo).]

Surveys and Taking-up of Land.—A survey of the hundred was begun in 1890 and completed in 1893 by Messrs. E. W. Krichauff, T. E. Day, L. C. E. Gee, C. B. Mann, E. A. Loveday, and H. Jacobs. The township was surveyed in 1904 by N. W. Pethick, when the railway had been decided upon. It 1893 a Bill for the building of a railway to Pinnaroo was before Parliament, but it was not passed. By 1895 a number of blocks were taken up, but as the railway had not materialised, most of the holdings were forfeited for non-payments of rent. In 1896 the Commissioner of Crown Lands said that orders had been given to cease alienating land in large areas near Pinnaroo until the Government had considered building a railway. In order to see if a railway was warranted, the Government proposed to cultivate some Crown lands at Pinnaroo, in order to ascertain if it would profitably grow wheat. In 1897 the Commissioner said no land was under cultivation at Pinnaroo, as, though contracts were taken out, no work was done because of the late season. I can find no evidence that this experimental cultivation was ever done—certainly there is no mention of the experiment in later Parliamentary discussions.

Railway Bill.—In 1901 a Pinnaroo Railway Bill was again before the House. Members were divided in their opinions concerning the advisability of building the line. The difficulty was that there was very little data to work on. Only a few pastoralists had lived in the country and they had not been successful; the opinion and experience of the Hensley brothers were often mentioned in the Parliamentary debates. The failure of the sheepmen very nearly prevented the passing of the Bill. One speaker said the land was not even suitable for sheep, as there was too much mallee and not enough grass, and he stated that the sheep got a disease through which their bones broke easily—even bumping a mallee was sufficient to break a leg. This was quite correct. It is now known that the "disease" was due to mineral deficiency, and traces of it are still to be found, especially in the "desert" and new areas. The use of fertilisers, especially superphosphate, has lessened its occurrence, and in a short time, as a greater mineral reserve supply is built up in the soil, the disease will undoubtedly disappear.

The only rainfall figures known were:—1883, 16.53in.; 1884, 16.22in.; 1886, 13in.; 1887, 17.2in.; 1888, 9.43in.; 1889, 22.47in.; 1891, 14in. These were given by the Hon. Addison, and were not official. A comparison with official figures of later years seems to show that they were a little too high. A very poor opinion of the soil must have been held, as even these very favourable rainfall figures did not encourage members—even one who was in favour of the Bill stated that 7bush. to the acre was too much to expect. Professor Perkins was said not to have valued the land very highly. The Professor has since stated that he did see some good country, but the difficulties of his journey of inspection and the much poorer country between Pinnaroo and Tailem Bend left the wrong impression on his mind. Mr. Goyder was also said to oppose the line. It is interesting to note that Pinnaroo lay outside Goyder's original rainfall line. It seems, however, that Goyder never crossed the Murray, and his placing of the line on the east of the Murray was not based on actual experience. When the land was opened up, the line was shifted northward, and Pinnaroo lies within Goyder's line nowadays. A Government party, consisting of the Hon. von Doussa, and Messrs. Paech and McKenzie, visited the area, and their report was favorable. The Bill was strongly advocated by two Ministers, Messrs. Foster and O'Loughlin, and much of the credit for the passing of the Bill must be given to these two men. One of the deciding factors was that the line would tap the "rich" Cow Plains of Victoria.

The Bill passed its third reading in the House of Assembly on September 16, 1903. The estimated cost was £180,000, later reduced to £153,000, the gauge to be 5ft. 3in. The narrow gauge 3ft. 6in. was strongly advocated, some even favouring a 2ft. 6in. gauge, which they said was 'successful' in India. Let us be thankful that another gauge was not introduced to South Australia. With the passing of the Bill land was quickly taken up. In August, 1904, the Treasurer, Hon. R. L. Butler, said 100,000 acres were allocated and 30,000 acres were occupied along the proposed route. By October this had increased to 200,000 acres. A group of Lutherans asked for a grant of 50,000 acres, but were refused as such a large unbroken area did not remain. The line was begun in 1904, and owing to many delays it was only officially opened on September 7, 1906, by the Hon. T. Price.

A branch line from Ouyen, on the Melbourne-Mildura line, was built to Murrayville. In 1914, giving relief to unemployed, this line was continued to Pinnaroo, so that Pinnaroo was in direct rail communication with Adelaide and Melbourne. From Adelaide to Pinnaroo is 161 miles by rail, Melbourne to Pinnaroo is 373, making a total of 534 miles between the capitals by this route. *Via* Wolseley, the distance is 483 miles. In case of emergency, there is thus available a good inland track, only 50 miles longer than the direct route. Strangely enough, the South Australian railways give the height of Pinnaroo as 344ft. above sea level, while the Victorians give it as 402ft., a difference of 58ft.

Value of Line.—The importance of the lines can be gauged from the fact that at present a passenger train arrives and leaves daily for Adelaide, two goods trains weekly run regularly, besides specials and a mixed train which leaves three times a week for Melbourne. In 1910 the harvest was good, and there were less sidings then than now, so that all wheat from the district was brought into Pinnaroo. For that harvest 270,000 bags of cereals were brought into the Pinnaroo railway yard. This was, and still is, I believe, a Commonwealth record for any railway station. The tonnage received at and forwarded from the Pinnaroo station and its siding, Chandos, for the last three years were:—

Pinnaroo and Chandos Railway Returns.

Year.	Tons received.	Tons forwarded.
1935	4,147	13,606
1936	6,590	10,936
1937 (to July) ..	6,016	7,337

56,850 bags (4,696 tons) of wheat are still in the yard, and very little of this year's wool clip has been received.

Population.—Though sections had been taken up before the passing of the railway Bill, it was not until the line was actually started that settlers took up the land and worked it. Most of the land was taken up in 1904. By 1910 the land along the railway line was in full occupation, and the population of such towns as Lameroo and Pinnaroo has remained steady since then, with only a slight decline from 1914 to 1920, owing to the enlistments in the A.I.F. There is a consequent slight increase after that period when the men returned. Though actual figures of enlistments are not to hand, the honour rolls in the district show that the district did its full share in the defence of the Empire. A population graph of the county shows a similar decline about 1914, but there is a big increase since 1921. This is probably due to three factors. Firstly, in 1915 a railway line was built from Karoonda to Peebinga in the north of the county running almost parallel to the Pinnaroo line, and from 20-25 miles north of it. The land, however, was not allotted until the cessation of the war. Then from 1921 the land was rapidly taken up, and is now well occupied. Secondly, the crops in the years around 1921 were all good ones in this district. Pinnaroo was in the "boom," and many farmers now in the district came around that time—farmers with grown-up sons in other districts wishing to increase their holdings came to Pinnaroo where land was to be had at comparatively low prices. Thirdly, as time went on, farmers cleared the land nearer and nearer the "desert" in the south, and with the improved agricultural methods, were able to work it profitably.

The number of acres under cultivation for the hundred of Pinnaroo is interesting, in that it shows the will with which the pioneers set to work clearing their holdings of mallee. The natural vegetation of the district was mallee and native pine, and this is now practically all cleared. A word of praise is due to these pioneers for their courage and industry. From horizon to horizon stretched the mallee scrub—the whole landscape was monotonous and uninviting. Some few were daunted, others remained, and some of these are still on the land at Pinnaroo, in spite of drought, the effects of war and depression, and they are justly proud of what they have done and of the progress of the town and district.

Naturally there was some land speculation at first. There are rumors of farms changing owners three times in one day, and certainly some bought land without having seen it. Fortunately this gambling was confined to a few, the majority set to work rolling down the scrub, building their homes and their sheds, and preparing for their first crop. As they had virgin soil there was no fallow, and in 1912, only eight years after the opening up of the land, the huge area of 60,000 acres was under crop in the hundred alone. Since then, owing to the necessity of resting the land, a slightly smaller acreage has been cropped each year. For the most part, the mallee was rolled and burnt, but stumps are still being dug up by the plough, and there has been some little trade during the depression in stumps. However, the time is not far distant when stumps will be scarce. Even now many farmers, thinking of the future, prefer to make big heaps rather than sell.

Harvesting Machinery.

[J. E. SWANN (Balumbah).]

In order to work a harvesting implement successfully and with a minimum loss of time in this country a man must be a first class mechanic. However, if he can work the type of implement most suitable to his type of country half the battle is over.

When reaping new or rough land a stripper is most suitable, as there are fewer working parts and less breakages. Besides, it is much lighter to pull, and if a man has only 8 horses he can put them all in and make an easy job of it, whereas a harvester would make it too hard for the horses. When the big wheel of a harvester hits a stump it brakes against the machinery and when it plunges quickly off the stump again it speeds it up again with a jerk; also the constant bumping and twisting does not do the frame and woodwork any good, besides having a tendency to rub the horses' shoulders.

A knife machine is the best for reaping a down and tangled crop, and if it has straw walkers it will handle the extra straw much better than an ordinary header.

A chain drive is better than a crown and pinion. Sand does not affect a chain so much, and it will not cut out if the wheel is not absolutely true. A set of chains such as are used on a reaper-thresher costs about £3 15s. Of course the man in favour of a crown wheel would say, "Look at the expense if the chains cut out," to which the obvious answer would be, "What about the crown wheels which have cut out in the last two years." A set of chains will last for years if run properly and not run too tightly.

The shaker box is practically the same on all machines and should be well looked after. It is one of the most important parts and is most likely to go wrong, as the continuous vibration shakes bolts, etc., loose. An inspection perhaps once a day with a spanner in hand will probably save a day of lost time. It is said that less shake and more wind should be used as shake costs money and wind is free, provided of course that the fans do not cut out.

Shallow grips on the big wheel are better than the larger sand grips, as these carry stumps up into the machinery; also they grip the stumps and break the bolts, and a grip swinging by one bolt is a definite menace to any part it may come in contact with. A steel bolt from a combine share is the best type to replace breakages with, although a daily tightening up of loose nuts will save much trouble.

Nauru—Home of Phosphate.

[G. Strawbridge (Kyancutta).]

Once upon a time a coral islet found itself raised above the level of the ocean. At first, of course, it was uninhabited, then came the time when sea birds fought for space to make a nest. For how long this state of affairs continued is not known, but we do know that they covered the island with millions of tons of their excreta. Slowly the rain dissolved out the phosphatic matter, wrought a chemical change, and converted the surface coral limestone into phosphatic rock. When the original inhabitants arrived is again, a matter of conjecture.

The island lies but 30 miles south of the equator and is only about 3 miles across. A narrow sandy beach is succeeded by a belt of coastal palms; the highest point on the island, about 200 feet, being part of the higher central part. Its area is about 5½ thousand acres, four-fifths of which is considered to be phosphate bearing and 5 years ago was estimated at not less than 50 millions of tons.

It is believed that the first European to sight the island was a whaler captain, one Captain Fearn, in 1798. He gave to it the name of Pleasant Island. But it was left to Captain Rojas, a Venezuelan, to make known its presence to the world. From his account, he was attracted by the friendly nature of the natives and was very complimentary in his remarks about the beautiful girls. Stories of that type get about, and it was not long before Pleasant Island became known as "The Sailor's Paradise,"—a pleasant island in more ways than one!

Then came the discovery of petroleum in America, the whaling industry collapsed and visits became less frequent. About 75 years ago a German company began to develop the copra industry. On about 1st October, 1888, the German gun-boat *Eber* appeared at the Island and took possession of Nauru in the name of the German Emperor.

And now let us pass on to the year 1900. The numerous phosphate deposits on various Pacific islands were well-nigh exhausted. At this time a Mr. Ellis, who had been interested in the phosphate industry, saw a curious stone that was being used to keep open a door in a Sydney office. It was thought to be a piece of petrified wood, but Ellis was suspicious. An analyst pronounced it to be high grade phosphate rock, and it was found that the specimen had come from Nauru. The Pacific Island Company, which had worked out the deposits under its control, approached the German Trading Co. and petitioned the German Government for concessions. Meanwhile Nauru's nearest neighbour, Ocean Island, also rich in phosphate rock, was claimed by Great Britain. Eventually the Pacific Phosphate Co. was formed to work the two islands—one British, the other German. The company agreed to pay the German Government the sum of £1,250 per annum plus 6d. per ton on every ton in excess of 50,000. In addition certain company officials were German nationals. At the outbreak of the Great War, of 63 Eureopean inhabitants, 22 were Germans, including the manager.

Nauru had been chosen as the site for a powerful wireless station, and this led to a visit, within 3 weeks of the outbreak of hostilities, of H.M.A.S. *Melbourne*, after which Nauru went off the air. It was in November, 1914, that the British Flag was hoisted and the Germans were deported. Australia now controls the island under a mandate from the League of Nations. The Australian, New Zealand, and British Governments bought out the Pacific Phosphate Co. for the sum of 3½ million pounds. A Commission was then set up to control the industry in the interests of the three governments.

To-day the Nauruans number about 1,400. Europeans 1,510, and about 1,000 Chinese coolies who do the work.

The present-day importance of this island, though undreamed of by whalers and copra growers, is solely its treasure of phosphate rock.

The Axe.

[C. A. Bullen (Chapman Bore).]

In many instances one will find the axe a very ill used tool and not until it is wanted for some fine work does the owner realise that he has neglected his axe. Every farmer should have two axes, one for splitting stumps, and one for cutting purposes. An axe that has been used for cutting wood for some time is better than a thin blade for stump splitting. Always see that the handle is well fitted. A fairly sharp edge is all the better, as at times it is necessary to crosscut a portion of the stump to get it to split. A little oil rubbed into the handle occasionally, makes for a longer life of the handle.

The axe for cutting.—In selecting an axe for cutting purposes always try and get a nice thin blade, fairly wide, and with not too much head. The Plumb is an ideal axe and usually gives fair service.

Keeping the axe in good order.—This is very easy; always grind well back to keep the blade thin and finish with an oil stone. Do not use the axe as a maul for hammering in wedges; the head of the axe will not stand up to that kind of work.

Selecting and Fixing the Handle.—Always try to get a small yet heavy handle; a thin handle is more comfortable to work with and gives the axe a better drop or fall. See that the handle is straight in the grain, free from knots and gum veins. The handle should be well put on, and should go into the eye of the axe without shaving if possible, as shaving tends to weaken it. If shaving has to be done always put the handle well on until the shoulder of the handle is level with the head of the axe; there is usually about 1½ inches of handle protruding when the axe is on, this should be sawn off and a saw cut put in the handle for wedging purposes. Saw off about half the knob on the handle end; this makes the axe more comfortable to use.

Tractor v. Horses.

Two papers dealing with this much-discussed question were read at the March meeting of the Miltalie Branch. Mr. D. P. Bagnell's paper dealt with the advantages of tractors, while Mr. R. G. Ramsey presented the case for the horse-team.

"The crawler tractor" Mr. Bagnell stated, "has done good service for many years, more so than the wheel type, for the wheel types were of little use in sand and were very hard on grips on the reef and stony country. A revelation has been caused by replacing the steel wheels with pneumatic tyres, enabling them to go through drift and to ride over stones and stumps without doing damage to the tractor or tyres, and also giving a tractor years more work and less upkeep, besides cutting running costs down to about half. This combined with crude oil, has brought out tractors to run at a very low cost, surpassing all expectations of a few years ago, and making it possible to work at a cost much below that of horses. The tractor has a big advantage over horses on a new selection, for there are no preparations to make such as stables, water conservations, fencing, &c., such as would be needed for horses, and it would be done more quickly and cheaply. The tractor is a great asset to a farmer in seeding, fallowing, working back fallow, and at harvest where one wants to get the work done quickly. With a crude oil tractor a farmer can do all his work at a lower cost than he could with horses, and, in less than half the time. In our district during the last few years the break up of the seasons has been rather late, causing some farmers with large areas to seed some of their land dry. This is definitely a mistake. In one instance two years ago a farmer put in half his crop before the rain, and the other, sown after the rain, produced more than double the yield, which would have paid for a tractor in the one year. This instance points out clearly the advantage of the tractor.

In seeding with a crude oil tractor and 20 combine, 50 to 60 acres a day can be seeded on good land, and with night working 100 acres could be done in the 24 hours. One will hear that a tractor is too dear to buy, although he will admit that they are cheap to run; but very often you will see the same man buy a car of nearly the same value, when that man should realise that the tractor will earn the money and a car is only a luxury.

It has often been said that if a farmer sold his horses he could not carry any more sheep by doing so; but the oats sown for green feed could be reaped and the grain fed to the sheep at a period when needed. He would also have the grass on stubble paddocks rserved for horses.

Now let us compare the running cost of the crude-oil tractor with the working of horses for the last two years since the crude oil and pneumatic tyre jobs have made their appearance in our district. Last year chaff was £6, this year £5, average price £5 10s. per ton. Now a ten horse team needs 1¼ tons of chaff a week, value £6 17s. 6d., and with a 20 combine at 25 acres a day it would cost 1s. per acre, compared with a tractor with a 20 combine covering 60 acres a day at a cost of 2¾d. per acre, not forgetting that the tractor is run into the shed when the job is finished, and that the horses have still to be fed. One has to pay double the price in wages and board to get the same amount of work done with horses.

Also I find the boys take more interest in their work when they can do such a big acreage a day, and there is not the drudgery as with horses, such as feeding up at night, harnessing up in wet yards, &c.

The tractor is a great asset at harvest time. Many days one may be out sewing bags when the weather is doubtful and if the weather is suitable one can put in a couple of hours or so being right on the job. Horses have pioneered the country for us and have done their job well, and in some cases it may be quite all right to keep a team in large holdings.

A tractor school would be a great help for the farmers of this district and the boys would take a big interest."

HORSES (R. G. RAMSAY.)

If a farmer has a good team of horses to-day, it is his own fault if he has not just as good team if not better in say twenty years time. It is hard to arrive at actual figures for the working cost as they vary every year. It depends a lot on the outside feed and the price of wheat, if wheat has to be cut. We should be able to grow our horse feed from oats grown on stubble, which works out very cheaply, but when one has to cut wheat it is more expensive. If a team were fed on wheaten hay at seeding time with 8 horses on a 17 combine it would cost about 7d. an acre, but of course when one cuts oats it works out much cheaper. Last year I reaped the wheat and fed the horses on oaten stubble Of course, horses have to be fed 12 months of the year, which is a disadvantage, but they eat a lot of stubble and bunch grass that sheep would not eat. If all farming were done with horses over a period of years the State would benefit generally, as all the feed would be grown locally and no money would go out of the State, as it would if it were all done with tractors. How would we fare if only tractors were used and we were growing a lot more wheat and we cut no hay? Would we find a market for all the wheat that would be grown? Then we have to grow oats on our stubble land, and one can very often cut all his feed from this and thus again reduce the costs of working.

In the event of war could supplies of fuel be kept up with? If supplies were cut off it would be a calamity. Would it be a wise plan for every one to let the horse team die out and buy a tractor? Could we all carry on in bad seasons and poor seasons and poor prices as well as good seasons and good prices? A lot of tractors had to be sacrificed when the last depression set in.

Pneumatic-Tyred Tractors for Agriculture.

[L. Brook (Hartley).]

In the last few years many valuable and important changes have been made on farm tractors. The changes were effected to give the farmer a tractor that will not only plough, but one that will do other farm work as well. Therefore quick steering was developed for better cultivation, higher speeds for faster travel, and greater clearance for cultivating various crops. To these is now added the most recent development, the air tyre, providing better traction, making higher ploughing and road speed available for use, less packing of the soil, greater fuel economy, a long-lived and an easier-handling tractor and one more comfortable to drive. It is a tractor for greater diversity of work without making changes in wheel equipment, and one that can be used for more purposes than ever before. Rubber on tractors is not new. Both solid and pneumatic tyres are being used on industrial tractors and have been used for several years. These tyres are made to carry heavy loads, therefore they cannot be used for farm work, due to the small area of ground contact causing excessive slippage. The air tyre has a large area of ground contact and approaches the draw bar efficiency of the crawler tractor. The air tyre is built light to deflect and give a large area of ground contact with low air pressure, but still the side walls are sufficienty stiff to carry the required torque without buckling. The tyres being light incidentally reduces the cost. The fuel saving is affected through the use of higher speeds. Pulling the same load in the 5-mile gear with air tyres at slower engine speed (which heretofore with steel wheels could only be pulled at 3½ miles per hour at full engine speed) not only means a substantial fuel saving but also more acres in a day's work. Many questions are bound to be propounded when air tyres are introduced, such as: Will the tyres puncture? How long will they last? Will they rot? Will they hold on hillsides? Can the farmer pump them up? How quickly can they be removed? Will they work in wet fields? Will they work in sand?

The time required to change tyres is insignificant; furthermore, punctures are almost unknown, due to the extreme flexibility and low air pressure and the fact that speed has much to do with driving nails or other objects into the tyre, whereas air-tyred tractors in the field do not exceed 5 miles per hour. The air tyre will flex and wrap around a stone or block of wood and still make excellent contact with the ground on either side. This makes it almost impossible for a loose nail or a spike to work itself into the rubber and it is bound to make for long and trouble-free life.

On wet ground the performance of the air-tyred tractor can be improved by the use of chains. Most field operation cannot be performed when the soil is very wet. An air-tyred tractor is even better for belt work. Machines can be placed in position quickly and easily and hauled over fields or paved roads with no loss of time. The thresher man's trouble has always been to get from one job to another quickly. Now he takes the main highways. In order to take full advantage of air tyres in hauling, the tractor should be equipped with at least 4 forward speeds, with a high speed of from 10 to 20 miles an hour.

One will also find that air tyres invite better care of the tractor. The user can always drive the tractor to town for repair jobs just as he does his car.

A better job of valve-grinding, new rings, or a general overhaul is done at less cost in a regular machine shop or tractor service station.

Points of Interest to Sheep Breeders at the Port Victoria Bureau Conference

In the discussion which followed the reading of an excellent paper, "Building up the Farm Flock," by Mr. R. E. Hasting (South Kilkerran), at the Port Victoria Bureau Conference on March 2, Mr. Bagshaw (Arthurton) urged farmers to avoid the use of a ram with an "overshot" mouth. The flock should be culled at shearing time, which he thought was one of the best ways of keeping the flock even in character. Mr. A. B. Ferguson (Arthurton) expressed some doubt as to whether it was a payable proposition for the farmer who kept only a small number of sheep to attempt to build up a flock, because so many cereal growers had changed over to fat lambs. Mr. S. Heinrich (South Kilkerran) was quite definite that it was profitable to build up his own flock, because of the danger of introducing bad weeds on to the cereal fields with sheep that were brought in from outside districts. Mr. L. Slade (Weavers) expressed the opinion that the tremendous swing over to fat lambs had been brought about by the wonderful prices that were being obtained for export carcasses. The farmer must realise that he could not have both; he must concentrate either on carcass or wool. At the present time quite a number of farmers were going out of the fat lamb trade because of the high price they had to pay for the breeding of ewes, up to 24s. per head.

Mr. L. Stanway (Boor's Plains) said fat lambs gave the producer a wonderfully quick and profitable return. Cast for age ewes could be picked up, from which at least two lambs could be expected, and would prove a very remunerative investment. It was a big job for the cereal grower to build up a good wool flock.

Mr. W. J. Spafford (Director of Agriculture) congratulated the writer on having presented a very practical paper to the conference. He said it would not be difficult for the farmer to maintain an even line of sheep in his flock if he made a strict practice of getting his rams each time from the same breeder. One speaker had referred to 24s. as being a high price for aged ewes, yet in New Zealand 2-year-old Romney Marsh ewes brought up to 46s. Old, broken-mouthed ewes, from which the fat lamb breeder only expected to rear two lambs, realised 27s.

Coast Disease.

Replying to a question as to what progress had been made in investigating coast disease, Mr. C. McKenna, B.V.Sc. (Government Veterinary Officer), said to all practical intents and purposes it could be safely said that this problem, which for so long had troubled sheep owners, had been solved. The disease was now known to be due to a deficiency of copper and cobalt, and that only very minute quantities of these materials were necessary to correct the trouble. The following mixture given in the form of a lick was proving quite effective:—Ferrous sulphate crystals, 40lbs.; manganese sulphate, 5lbs.; zinc sulphate, 2lbs.; copper sulphate, 2lbs.; cobalt sulphate, 1lb. These ingredients should be ground together to a powder and 2lbs. of the mixture added to every 100lbs. of common salt, mixing thoroughly. If numbers of sheep were affected, a drench of the lick (minus the salt) could be administered, dissolving 8ozs. of the lick with 2 fluid ozs of spirits of salts in 1 gallon of water, the dose being 2 fluid ozs. twice a month as well as offering the lick. Phosphates should not be mixed with this lick.

Hand Feeding.

It was particularly pleasing to hear delegates refer to the fact that in the past 12 months many automatic sheep feeders had been purchased by farmers on Yorke Peninsula—concrete evidence that farmers are realising the necessity for supplementing paddock grazing. Mr. R. C. Scott (Chief Agricultural Adviser) told a representative of the South Kilkerran branch that about 1¼lbs. of good hay chaff was sufficient to maintain a ewe in strong condition, but about two weeks before lambing this should be increased to 2lbs. and continued after the lamb was dropped. If grain was fed, Mr. Scott recommended 1lb. of barley per head per day, with paddock roughage, and as lambing time approached increase the ration by ½lb.

Bad Weeds on the Peninsula.

Mr. O. Jericho (Arthurton) expressed concern at the increase of new weeds that were appearing on Yorke Peninsula—Ice Plant, Three-cornered Jacks, and Hoary Cress. He and other delegates inclined to the opinion that these were possibly being introduced to the district through sand being added to the superphosphate. This sand, it was said, was being obtained from a district where Three-cornered Jacks were particularly bad. Conference decided to ask the fertilizer companies to take steps to eliminate weed seeds from sand that was added to super. The danger of Skeleton Weed being introdued in seed wheat that was being brought from New South Wales on to the Peninsula was also mentioned, and it was decided to ask the Government to again introduce a Pure Seeds Bill.

Field Day at Mypolonga

The Mypolonga branch invited members of other branches in the swamp areas of the River Murray to a field day on March 24, under the direction of the chairman (Mr. D. Hill) and the secretary (Mr. V. Wright).

Mr. P. J. Baily, who represented the Advisory Board of Agriculture, stated that there were many people who did not have a proper conception of the work of a swamp area on the Murray. It was thought, for example, that pumping stations were merely intended for irrigation purposes only, and not for the all important means of drainage which made it possible to grow irrigated crops. Through the system of barrages, irrigable water would be available in the spring, right through the summer until the autumn, and this would give greater assistance to settlers. It was not possible to grow pastures efficiently without frequent waterings of at least every three weeks.

The party visited the canning factory of Mr. L. Haynes, where the fruit—mostly pears and peaches—was processed immediately it was received in the shed from the orchard. This factory was established about 10 years ago in a small way, and now has a capacity of canning 40,000 tins per annum.

After an inspection of the pumping station the visitors were entertained at lunch by a committee of ladies and afterwards assembled at Messrs. H. and W. D. Davey's property, where Mr. R. C. Scott (Chief Agricultural Adviser) addressed the settlers on the varieties of pastures recommended for the swamps.

At the Mypolonga Co-operative Society packing sheds the manager (Mr. A. H. Burrett) explained that the whole of the society's operations were of a co-operative nature. Besides the ordinary functions of co-operative packing shed, purchases of requisites were made for suppliers, and the finished article was sold on co-operative lines in English markets.

Mr. A. G. Strickland, M.Sc. (Chief Horticulturist) and Mr. E. Leishmann (District Horticultural Adviser) addressed the meeting at Messrs. Voigt Bros.' orchard on general fruit topics applying to irrigated areas.

Activities of Women's Branches

COONAWARRA.

At the meeting held on 20th April, members gave short talks dealing with their Experiments and Hobbies. Mrs. H. A. Reschke gave a report of the proceedings of the Conference at Robe. The following paper was read by Mrs. W. Davis:

Puddings.

As a food, puddings supply sugar and starch to the body.

There are three main classes of puddings namely. (1) Boiled. (2) Steamed. (3) Baked. Boiled puddings are tied up in a cloth and cooked in boiling water, such as plum puddings or plain suet puddings.

Steamed puddings are put into a mould and cooked by steam such as—date puddings, jam roll, or sago fruit puddings.

Baked puddings are cooked in the oven in a dish; *e.g.* milk puddings or custards. Boiled puddings are light, wholesome, and nourishing, and suitable for cold weather.

Suet is used, beef suet being the richer, but mutton suet lighter. It should be firm, dry and finely shredded.

A boiled pudding should be mixed fairly stiffly, so that the flour absorbs the melted fat while cooking and prevents the puddings from becoming sodden.

They should be tied in a floured cloth, leaving room for swelling, and must be well covered with boiling water all the time they are cooking.

Steamed puddings are the lightest and are cooked in a greased mould or basin with a piece of greased paper over the top. The basin should be only three parts full, allowing the pudding to rise.

There are two ways of steaming puddings. (1) Place a mould in a covered steamer fitted over a saucepan of boiling water; (2) place a mould in a saucepan of boiling water, the water reaching only half way up the basin. The saucepan should be kept boiling rapidly to create a good volume of steam. The fat should be clarified fat or butter. Suet takes too long to cook.

Baked puddings are very nourishing and easily digested They are made from cereals, milk, eggs, and sugar, and are good summer puddings and most suitable for children, the aged and invalids. Always see that the cereal is well cooked and baked in a moderate oven.

If a milk pudding is made without an egg, such as baked rice or creamed sago, stewed fruit may be served with it. To test whether a baked custard is cooked, shake the piedish a little to see if the custard is set.

In conclusion, here is a good hint to remember. A recipe consists of three parts: (1) The name; (2) the list of ingredients; (3) the method.

Before beginning to follow a recipe read it through, carefully note the time for cooking and the method of cooking employed.

Recipes.

Boiled Plum Puddings.—½lb. suet, ½lb. flour, ½lb. sugar, ¼lb. bread crumbs, 1 wine glass brandy, a little salt, 5 eggs, ½lb. raisins, ½lb. sultanas, ¼lb. lemon peel, ½ nutmeg.

Boil 6 hours.

Sago Fruit Pudding.—1 cup of bread crumbs, 2 large tablespoons of sago soaked in enough milk to cover, soak over night if possible, ½ cup sugar, 1 cup raisins, 2 tablespoons butter, 1 teaspoon soda dissolved in boiling water. Method—Mix with enough milk to make fairly slack. Steam 3 hours. This is fairly rich, if double quantity is required the same amount of butter and raisins as above will be sufficient for a plainer pudding.

Plain Suet Pudding.—¼lb. suet, ½lb. flour, ½ teaspoon baking powder, 3ozs. sugar, pinch of salt, ½ cup water or milk, 1 teaspoon of golden syrup.

Steam 2½ hours.

Date Pudding.—6ozs. flour, ¼ cup milk, 1½ozs butter, 4ozs sugar, 1 egg, 4ozs dates, pinch of salt, ½ teaspoon baking powder, 1½ozs. fat.

Steam 1½ hours.

KYBYBOLITE.

First Aid to the Injured.

(Paper read by Matron Nicholls of the Naracoorte Hospital at the March meeting of the Kybybolite Branch.)

Principles of First Aid.—One must be (1) Observant, that one may note the cause and signs of injury; (2) Tactful, that one may without thoughtless questions learn the symptons and circumstances attending the accident or sudden illness; (3) Explicit, that one may give clear instructions to the patient or the bystanders on how best to assist one.

Always remove the cause of injury, or danger, when-ever possible.

Severe Haemorrhage must receive the first attention, no matter what are the other injuries.

Rest and warmth are most essential, especially in fracture cases.

(*a*) Stop bleeding.

(*b*) Prevent injurious germs from getting into the wound.

In Cases of Fainting.—The head should always be lower than the rest of the body: hence if a patient should be sitting when the attack occurs, immediately bend the head between the knees, with the arms hanging down to the sides, or, if necessary, lay patient flat on back, with head lower than trunk.

Never disturb a clot of blood, if haemorrhage has set in, and never attempt to clean a wound with other than sterilized water. Dry dressings, such as Iodine, or B.F.I. Powder, are very good antiseptics. Ointments, or oily dressings should never be used.

Haemorrhage.

When arresting haemorrhage, always elevate the bleeding part, as thereby less blood finds its way into wound. The patient should always be placed in a most comfortable position, bearing in mind that the blood escapes with less force when the patient sits, and is still more checked when patient lies down.

Blood from an artery is scarlet, and if the artery is wounded and near the skin, the blood spurts in jets corresponding to the pulsation of the heart.

Pressure point is on the heart side of the wound.

Arterial Haemorrhage can be arrested by pressure position of the body and elevation of the bleeding point.

Pressure may be digital, that is, applied with finger, or thumb on the wound or the spot called the pressure point. If haemorrhage occurs in lower arms, apply pressure above elbow, and if in lower leg, apply pressure above knee. Before applying pressure, remove foreign bodies, such as broken glass, bits of clothing, hair etc., which can be seen in the wound; never search for foreign bodies you cannot see.

Cover the wound with a clean and firm absorbant dressing, bandage tightly over the pad, unless there is danger of causing injury to a fracture, then only a very light bandage should be used to hold pad in place.

Stimulants such as hot tea, coffee, or milk, would be quite safe, unless injuries to the chest or abdômen have been noticed when only ice to suck should be given.

Arteries convey blood from the heart, and Veins, convey blood to the heart.

The heart contracts in an adult at the rate of 72, per minute.

Venous bleeding one generally finds in cases of varicose veins, and is much darker in color than arterial bleeding.

Care as to position and comfort should be observed. Elevate the part, expose the wound, and remove any constrictions, such as garters or bands, from heart side of wound. A pad and bandage applied evenly and firmly, and support to the injured part, are most essential.

Capillary haemorrahge is always red, and it flows briskly, in a continuous stream, or it may ooze from the wound. A slight amount of pressure will suffice to arrest capillary haemorrhage.

Blood issuing from the mouth may come from the tongue, the gums, the socket of a tooth after an extraction, the throat, lungs, or stomach.

To treat from the tongue, gums, tooth, socket or the throat. Ice or cold water only, should be given, and then to be held in mouth for a few minutes at a time. If this is not successful give water as hot as can be borne, to hold in mouth, and failing this, a medical practitioner should be called in. Never give alcohol.

Haemorrhage from the lungs is bright red and frothy and only ice to suck should be given and a medical man's service obtained at once.

Haemorrhage from the stomach is black, like coffee grounds, and may have food mixed with it. Never give anything per mouth until a medical man has seen patient.

Haemorrhage from the nose should be treated by placing the patient in a sitting position in a current of air before an open window, with the head thrown back, with mouth open; and on no account must the patient breathe through his nose. Pressing the nose firmly between finger and thumb often relieves bleeding. Often the nasal cavity has to be plugged, and this should be done by a medical man.

Blood issuing from the ear channel, generally indicates a fracture, of the base of the skull. No attempt must be made to probe or plug the ear; blood should be wiped gently away as it issues.

Bruises.—Apply ice or cold water dressing.

Sprains.—Apply a bandage tightly to area, until one gets the patient home and the limb in a most comfortable position. Apply ice or ice-cold water compresses to joint as long as it relieves pain. If that fails to give relief apply hot fomentations.

Strains or Ruptured Muscles.—Place the patient in a most comfortable position where the injured part can be well supported. Apply hot bag, Antiphlogistine, or hot foments to injured part, when pain is severe.

Dislocations and fractures should never be touched by anyone other than a doctor. For ease, hot towels wrung out an applied frequently would relieve pain.

Abrasions.—Never apply ointment or oily dressings. Iodine, Boracic Powder, or B.F.I. powder is more suitable.

Burns.

Burns are caused by dry heat, such as fire, a piece of hot iron or wire, or dynamo charged with a high pressure electric current, also by an acid substance Sulphuric Acid, Caustic Soda, Ammonia or Quick Lime, or friction caused for example by coming in contact with a revolving wheel.

If a burn is caused by an acid, bathe the part with Soda bi-Carb,; if by Caustic Soda, bathe the part with a weak solution of lemon juice, diluted vinegar equal quantity of water. Always brush off any powder that remains on the part before bathing.

If clothing catches on fire, always lay the patient flat on the floor at once. If the front of the dress catches alight, always lay the patient on back, and *vice versa,* if back of dress catches on fire. Treat for shock, and get medical advice.

A scald is caused by moist heat, such as boiling water, hot oil, or tar. The effect may be a mere reddening of the skin, blisters, may be formed, or even the deep tissues of the body may be charred and blackened. The clothing may adhere to the burnt skin, making its removal impossible without detriment to the injured part. The great danger is shock. Never break blisters; immediately cover area with linen soaked in Picric Acid solution or cold tea, and keep damaged area covered from the air. When the injured surface is extensive, do not cover it with one large sheet of dressings but with strips about the breadth of the hand, as on renewing the dressing one should not expose too much of the burnt surface at a time, thereby lessening the shock to the system.

Be very apprehensive of danger in the care of burns, even slight burns of the neck. Always consult a medical man as soon as possible.

Bites of snakes and mad animals and wounds of poisoned weapons. Immediately place a constriction between the wound and the heart, to prevent the venous blood from carrying the poison through the body. Encourage bleeding for a time, by bathing the wound with warm water and keeping the injured limb low. The wound could be cauterized, if unable to procure the services of a medical man, by a match cut to a point and dipped in pure carbolic acid, or by a red-hot wire. Cover the wound with a clean dressing, after removing the ligature, also treat for shock. A bite from a venemous snake. Rub in powdered Condy's crystals, after scarifying the punctured wound, and see a doctor.

Stings of Plants and Animals.—Always extract the sting, and mop the part freely with diluted Spirits of Ammonia. Failing this apply the Blue Bag, or washing soda solution.

Needle embedded under the skin, which disappears after penetrating the skin, should have the services of a doctor at once.

If a fish hook becomes embedded in the skin, never attempt to draw it by the way it entered, but cut off the dressing of the hook, so that only the metal is left, and then force the point onwards through the skin, until the hook can be pulled out.

Foreign Body in the Eye.—Always prevent the patient rubbing the eye. Apply pad and bandage and see a doctor. Steel in the eye should be treated in the same way.

If Quick Lime or Caustic Soda, should enter the eye, brush away as much as possible, bathe the eye with vinegar and water, equal parts of each, and cover with pad, and bandage.

Foreign Body in the Ear or Nose.

Make no attempt to treat the patient, if the services of a doctor can be had. If an insect is in the ear passage fill the ear with warm Glycerine or Olive Oil, when the insect will float, and then may be removed. Never syringe or probe the ear while a foreign body is in the ear passage.

Foreign body in the nose is not a very serious matter; induce sneezing by pepper or snuff, which will cause the patient to blow his nose. Close the unaffected nostril while this is going on.

Sun Stroke and Heat Stroke.—Always undo all tight clothing, and remove patient to a cool shady spot. Lay the patient down with the head and trunk well raised. Procure as free a circulation of fresh air as possible, and fan the patient vigorously. Apply cold water to the head, neck and spine, and continue treatment until the symptons subside. On return to consciousness the patient may have water to drink

Convulsions in children are generally due to teething or stomach troubles. The child should be placed in a bath of warm water or a mustard bath—if the latter is used, 1 tablespoon of mustard to a gallon of water. Oil body of child before putting in bath, to prevent burning. See that mustard is mixed to an even paste, with no lumps, before it is mixed in the bath. Place a sponge dipped in cold water on the top of the head. Bath to be slighty above the temperature of the body, 98 degrees.

Choking.—Open the mouth, forcibly, if need be, pass the fore-fingers right to the back of the throat, and attempt to dislodge the foreign body; if vomiting results, so much the better. If unsuccessful, thump the back hard, whilst the head is bent forward.

Poisons.

Obtain the advice of a medical man as soon as possible. For those which do not stain the mouth, an emetic can be given; and for those that stain and burn the mouth no emetic is to be given. Strong tea acts as a neutraliser of many poisons, and is always safe. If a person has swallowed poison, and threatens to go to sleep, keep him awake by walking about and slapping his face, neck, and chest with a wet towel. If the throat is swollen as to threaten obstruction to the air passage, apply hot flannels to the front of neck, and give frequent sips of water, and seek the services of a doctor immediately.

Carbolic Acid.—Give milk, to a pint of which half an ounce of Epsom Salts has been added.

Prussic acid has a smell of bitter almonds, and the action of this poison is very rapid. Dash cold water on the head and spine, continuously, and treat for shock and collapse.

Poisonous Meat, Fish and Mushrooms.—Give an emetic of salt water—a tablespoon to a large tumblerful of warm water—or Soda bi-Carb. 2 dessertspoonsful to a tumblerful of warm water. When the emetic has acted give Castor Oil. Preserve any vomited matter, food or other substance suspected of being poison, for the doctor to see.

Strychnine.—Patients have signs of convulsions and a feeling of suffocation. Give an emetic of weak Condy's Solution, keep warm, and procure medical aid as soon as possible.

If an Acid (such as Sulphuric Acid, Spirits of Salts, Carbolic, and Salts of Lemon) is known to be poison.—Give an Alkali at once. Wash the mouth out first with lime water, soda, chalk, or whiting, and then let the patient sip a little of it.

If a strong Alkali (such as Caustic Potash or Caustic Soda) is known to be the cause, give an acid at once. Wash the mouth out freely with lemon juice, orange juice, or vinegar diluted with water, and afterwards let the patient sip a little of it.

For gas poisoning by Carbon Monoxide or vapours from charcoal stoves. Treat as for collapse, give stimulants, and Oxygen.

Hypnotics (Veronal, Chlorals).—Rouse patient, and give emetics and stimulants.

Arsenic, used in rat poisons, weed killers, green paints, agricultural sprays. Treat as collapse, give emetics, the magnesia, or Cream of Tartar.

Iodine.—Treat as for collapse, give emetics, lime water, starch and water and stimulants to drink.

Phosphorus.—Contained in matches, and some rat poisons. Treat with emetics of bluestone grns. iii in water every five (5) minutes, until patient vomits. Wash stomach out with Condy's Fluid. 1 per cent. Give white of egg. Alkalis.

Drowning.—Place patient on stomach, keeping head lower than rest of body, stand beside patient and compress ribs with hands about 18 times to one minute. Treat for shock, and keep patient warm.

LAURA BAY.

Mrs. W. Burke presided over the March meeting. Members displayed numerous articles made from the scrap bag, including an apron and frock hanger and many kinds of cushions. Mrs. F. Edson read a paper "Tomato Sauce Making," and the following paper was read by Miss R. Blumson:—

Sandwiches.

There are numerous different fillings for sandwiches, both sweet and otherwise, so there is no reason why anyone should tire of one particular variety. It is a well-known fact that the majority of people prefer savoury fillings. Since sandwiches are so well liked it would be a wise thing for women to remember this point when preparing suppers, etc. At fetes and big entertainments where such a great amount of food is required, the convenors always buy a certain amount of bread and ham and the helpers usually come forward with sufficient butter.

The absence of sandwiches is particularly noticeable at country entertainments where ladies are asked to bring a basket. On such occasions no one knows what the others are bringing and it frequently happens that there is an abundance of sponge sandwiches, especially when eggs are cheap. Such a lot of people do not care about eating sweet things at all if sandwiches or scones are available. Always pay special attention to arranging sandwiches and garnish them with parsley when necessary. Never put too many sandwiches on one tray. There are all manner of fancy cutters procurable if one cares to cut the candwiches into fancy shapes.

The sandwich loaves of bread are preferred as they are of an even shape. Very new bread is awkward to cut and it is advisable to use bread from 12 to 18 hours old for best results. Stale bread will never make nice sandwiches no matter what is put in them. When getting bread from the baker it saves a lot of trouble to pay the extra penny per loaf and have it sliced. It should be kept properly air-tight until wanted for use, otherwise it becomes dry.

A liberal amount of butter should be used on the bread. Ham and most meat sandwiches are greatly improved by the addition of mustard. Tomato sandwiches seem to be an outstanding favourite. A sprinkle of sugar, besides salt and pepper, is an improvement. Minced celery and thick cream and a little salt put between thin slices of brown or white bread is delicious.

Shredded lettuce and salad dressing is also nice. Many different fillings can be made with a good boiled salad dressing as a foundation. Finely sliced gherkins, pickled onions, chopped small, or grated celery, radish or beetroot. Sliced beetroot also looks very attractive in sandwiches. Finely minced carrot mixed with a little cream, lemon juice, salt and pepper provides a health-giving sandwich. Eggs can be used in various ways with cheese, curry or onion to suit one's taste.

There are quite a number of fish and meat pastes on the market and marmite, the vegetable extract, is perhaps more nourishing.

There are various sweet sandwiches, and the following are nice for those who care for a sweet sandwich:—Banana, date, fig, prune, dried apricot minced. Crushed strawberries and whipped cream make delicious sandwich—in fact any soft fruit can be used this way sprinkled with sugar. Grated nuts and chocolate can also be used.

LOBETHAL.

Jam and Jelly Making.

[Paper read by Mrs. T. Lutze, at the March meeting.]

Iron or tin utensils should never be used for jam or jelly making. The fruit acids attack these metals and give both bad colour and taste to the fruit. The pan should be broad rather than deep and big enough to prevent boiling over, and it may be porcelain lined, enamelled, or aluminium.

As in other work the proper tools or utensils are necessary for the best results in jam and jelly making, such as preserving pan or steam cooker, colander, wire sieve, wooden spoon, measuring cup, saucepan scales for large fruits if possible; also mooden masher, cheese cloth, jelly bag and plenty of clean cloths or towels.

When the fruit is purchased, keep it where it will remain cool and free from dust and flies until ready for use. System will do much to lighten the work. Have kettle ready for sterilizing the jars, and all necessary utensils and sugar at hand. Then with a moderate amount of fruit to put up at one time, the work should be a pleasure.

For jellies as well as jams one should always use firm, sound fruit. Only the best should be used if one looks for good results. Fruit should be a little on the green side. Over-ripe fruit will not jell. When making jam, if you put one tablespoonful of glycerine to the jam just before taking it off the fire it will always keep.

When the jam is finished boiling, it should be allowed to stand in the perserving pan for about 10 minutes only, as it is better to bottle it quite hot. It is best to fill in the jam as soon as it is cooked, because then it forms a skin on top, which helps to preserve it. Moreover the jam is more likely to be clean and free from dust.

The bottles or jars should be washed, drained, and made perfectly dry, then filled with hot jam and closed down while still hot. It is better to tie the jam down with waxed paper than to use metal lids; the jam keeps better. For a few pence one can get quite a lot of waxed paper from the stores. If jam does not keep well, it is due to one of the following mistakes:—(1) Fruit over-ripe; (2) too little sugar; (3) jam stored in a place that was too hot or too damp; (4) jam boiled too little or too much.

To make jam without being sure that it will keep is a waste of food, money and time, so before starting on the next batch be sure that everything is ready.

Pectin.

Always buy under ripe fruit; this contains a substance called "pectin" which makes the jam set. Some fruits like currants, contain a good deal of pectin, while others like strawberries and raspberries contain very little; that is why strawberry jam does not set well, and why we add lemon juice or tartaric acid to make it do so. For the same reason, we often add red currant juice to raspberry jam, so that it will be firm instead of liquid. It is possible to buy bottled pectin, which prevents any trouble over jam that will not set. It does not lessen the quality of the jam in any way, and is perhaps not so well known as it deserves to be. With bottled pectin the jam wastes much less, as it is only boiled for about 5 minutes, and yet it sets beautifully. Sufficient sugar must be added; the usual quantities are 1lb. of sugar to 1lb. of fruit, if the fruit is under ripe, and ¾lb. of sugar to 1lb. of ripe fruit.

The jam must be stored in a cool, dry place, as heat makes it ferment and damp causes it to become mouldy. A shelf will do to store jam, if it is in a good position, and not high up in a kitchen, for remember heat always rises.

Boil jam until it will thicken and set quickly—that is, when a drop or two will set when put on a saucer. Another way to tell if it is right is to hold up a spoonful of the boiling jam. If it runs off the spoon like water, it is not done, but if it drops off in fairly thick flakes, then it has boiled long enough.

Some people think that provided they boil the jam for a sufficient length of time it is bound to set, but the truth is that long slow boiling will prevent the jam from setting, besides wasting it, and spoiling the colour and the flavour.

With the above hints we are ready to make our jam.

Do not put fruit and sugar in the pan at the same time. It is best to boil the fruit first till it is soft. Some fruits can be boiled without water, some need a little water to start them. When the fruit is boiled soft, the sugar can be added, and the jam stirred over a slow fire till the sugar is dissolved. The reason for putting in the sugar after stewing the fruit is that if the sugar is cooked too long it becomes dark in colour and spoils both colour and flavour of the jam. When sugar is dissolved you can cook the jam quickly till it sets.

If for any reason the jam should go mouldy or become fermented, it is useful to know what to do. If the jam is only a little mouldy, the surface can be scraped off and the jam boiled up again, with a little more sugar, for 15 minutes. If the jam is slightly fermented, remove the surface, and boil for 20 minutes; but if badly fermented then nothing will get it right again, and it must be thrown away.

If jam is sugary on top, place jar of jam so affected in a warm oven until the jam warms when the sugar will melt and not trouble that jar again. Another way is to pour a little boiling water on top of jam, let stand on side of stove for a while till sugar dissolves, then stir and use.

Substitute for Raspberry.—Mince 2 peeled quinces, add 3lbs. of peeled tomatoes, add 5lbs. of sugar and boil 2½ to 3 hours. This is equal to raspberry jam.

Strawberries and grated pineapple make a delicious combination.

Another way to make jam is to put fruit and sugar together in preserving pan, add water if desired. Mash some of the fruit so as to form a syrup quickly. Put on a slow fire till the sugar is dissolved, and then boil quickly till it is of the proper consistency. Push beneath the syrup any fruit that is not cooking, but on no account stir it as the fruit rests on top if not stirred.

JELLY.

Jelly is not so cheap as jam, as it is made from fruit juice instead of the fruit itself. After the fruit has been boiled, the juice is strained through a cloth or jelly bag, and if the jelly is to be clear, the pulp must not be pressed through the cloth. An easy way to strain jelly is to turn a kitchen chair upside down on the table, and stand a basin on it, then tie the jelly bag or cloth to the legs of the chair and pour the hot fruit into it, when the juice will run into the basin. If firm, not too ripe fruit is used jelly making should always be successful. If jelly is boiled with a cover over the pan it will have a better colour.

Wash fruit if necessary, cut up skin and all, nearly cover with water, boil till soft, but not too long; it will get muggy if boiled too long. A good way to strain fruit when it has boiled long enough is first through a colander and, when the sugar has been added, through a jelly bag or cloth. Measure juice, and to every 1lb. of juice add 1lb. of sugar. This is a better method than adding cup for cup, as some juices are heavier than others, and therefore some need more sugar. One should always warm the sugar before adding to the juice; this gives a clearer and better coloured jelly. Jelly should boil rapidly after the sugar has been added, for 20 to 30 minutes; it should jell by then. If boiled too long it is likely to go syrupy. Do not skim the jelly when cooked. Let it stand for 10 minutes, push scum aside and fill the jelly glasses. Tie down with waxed paper while still hot. When cold, store away on pantry shelves.

MALTEE.

A House Frock Competition was held in connection with the March meeting, the entry by Miss R. Talbot securing first place with Miss A. Basham second and Miss S. Schwarz third. At this meeting the Branch birthday cake was cut during supper and distributed among those present. Miss L. Schwarz read the following paper written by Miss D. Blumson:—

Pest Destruction in the Home.

No matter how many precautions are taken insects will at times invade the home more particularly in the summer months. Perhaps the most troublesome is the common house fly. These flies, although small soon dirty windows, walls and ceilings. Fly-spray, swats and poison papers are good exterminators. Papers prepared from some stick substance to which flies adhere, and endure a slow torturing death should be avoided. An effective fly-trap is made by half filling a glass jar with soapy water and covering it with paper which has a hole cut in the centre large enough for a fly to go through, a little jam being placed inside around the hole. Another good way of getting rid of flies when they become numerous is to disinfect the room with sulphur.

Ants.

Ants are very troublesome if their nests cannot be seen. If this is the case tie strips of cloth saturated in castor oil or kerosene around legs of tables and safes. Ants are very averse to strong smells and so a little phenyle or petrol is effective if poured into their holes. An ounce of carbolic soap dissolved in a gallon of water and sprinkled on ants will kill them. Strong lime water has the same effect. A mixture of ½tspn. borax to 1 tspn. of honey and sugar mixed with water proves successful.

For silverfish sprinkle powdered alum in all crevices where they harbour and they will soon go. Another point is always to include alum in paste for pasting the backs of pictures.

Strict cleanliness, good ventilation and plenty of fresh air and sunshine are the greatest enemies of fleas. Fleas flourish in dirt, warmth and darkness; these condition favour their development. Lumps of camphor are good protectives. Various powders are obtainable, but the chief destroyer is cleanliness.

Borax and sugar in equal quantities will cause cockroaches to disappear and there will be no sign of them for months.

Moths will not attack cotton or newspaper, so if woollens are to be laid aside for any length of time, brush well, roll in newspaper and put them in a calico bag. For extra safety add something aromatic, such as cloves, carraway seeds, camphor or naptha balls. The moths seem to dislike printer's ink on papers. Turpentine rubbed on all joints of a wardrobe prevents them from entering. Epsom salts sprinkled in boxes and drawers will keep out silverfish and moths.

If mice are plentiful leave no food uncovered and either lay traps or baits. Care must be taken to collect all carcasses especially if there are domestic animals about the house. Mice are fond of paste, but cayenne pepper added to it will stop this habit.

MYPONGA.

Turkey Raising.

The subject of the meeting held on 10th March was a paper by Miss R. Eatts, which reads as follows:—

It is necessary to have for breeding the best birds one can procure. Keep them as well as is conveniently possible and as circumstances will permit. In one wishes to rear turkeys one must be prepared to devote a good deal of time in attending to them, otherwise the proposition will be a failure in this or similar districts. In warmer localities where grain is grown it is a much different concern as far as rearing and feeding goes, as the expenditure is considerably less, which is a very big factor. It is necessary to have light, airy sheds in which to house them, and the sheds must be dry and not draughty. It is also advisable to have a yard attached where they can run while the weather is damp, as wet and cold are fatal to young birds. The houses must be kept clean and free from vermin. They should be whitewashed occasionally. An earth floor is the best.

In this district turkeys usually commence to lay in September, generally from 10 to 14 eggs in a setting. Incubation takes 1 month, during which time the hen seldom leaves the nest, except for a feed, drink, and dust bath. When the young ones are hatched, they are very timid, and are rarely seen for a few days. Food, water and chaffed green feed must be kept near them as the first few weeks are the most critical in a turkey's life. Turkeys must have dry conditions; on no account must they get wet and cold. When turkeys are very young feed them on bran and pollard and hard boiled eggs mixed to a crumbly consistency. If the food is too wet it sticks to their beaks and encourages crop trouble. As the chickens grow older vary their food, giving them crushed grain, bran and pollard and a handful of meat meal to a feed. After the birds are 2 months old feed them on mash morning and night and grain at mid-day. It is advisable not to allow young turkeys to roost on perches too early; if they do crooked breasts will be the result, and a much lower price will be obtained when fit for market. From 8 months on birds should be a good weight and fit for market. For the last 2 or 3 weeks they should have as much food as they will eat and not too much exercise. Diseases have not been encountered with the exception of a few minor ailments. These conditions are attributed to not keeping houses, drinking vessels and general conditions clean. It is a good plan to shut the birds safely in their houses at night, as foxes are most partial to them.

Kitchen Gardening.

At a meeting held on 6th April Mrs. Magor read the following paper:—

Kitchen gardening is profitable, pleasant, and satisfactory. Profitable, because one saves the hard cash one would have to pay out for vegetables; pleasant, because the employment in the open air and the ultimate array of beds and plants in neat order is pleasing to the eye; and satisfactory, because the results of one's labours are the tender vegetables for the table which are always fresh and ready to have just when needed; and if, as sometimes happens, they are not as large as the market gardeners' product, they are sweeter, as they have not been cut for days and withered.

The layout of the vegetable patch is important, especially in this locality, where it must be well drained in winter.

I grow all my vegetables on raised beds, summer as well as winter crops, and find them most satisfactory. Each bed is raised about 8in. of 10in. by adding manure and leaf mould, the latter made by gathering all weeds, leaves, &c., and putting them in one heap. When well rotted, I find this a big help to keep the beds right. There are two ways of starting new crops each season seedbeds and seedlings from the nurseryman. There is no doubt that home-grown seedlings are the best, but, failing these, seedlings procured not too large and put in on a cloudy day or in the evening should go right ahead.

Sometimes, when placing out the young plants and it seems likely to be hot on the morrow, a good plan is to get boughs of a tree, break off the small leafy twigs, and lay them across the row, shading the seedlings. I have proved this to save them from withering. The same applies to flower plants. This last season I put out over 200 petuna plants in one of the hottest spells we had during November and by covering them with leaves not one was lost.

Late summer and autumn plants do well from the start, especially if the ground is made up into trenches about 9in. deep and filled to within 3in of the top with a mixture of three-quarters manure and one-quarter soil. When the plants are growing strongly, fill the trench with manure and keep it well watered till rain sets in.

French Beans are not difficult, if care is taken to make a good rich bed or trench and keep them well watered from the commencement of growth. A few rows of the dwarf variety come away quickly for early crop, but the climbers give about three times the returns for the same amount of care and trouble. Of course the climbers are more trouble at first, but if good strong trellises are made of posts and wire netting they can be used again and again. I have used mine for four years and they are still good. Beans should be planted at intervals of four or five weeks to be sure of plenty during the whole season until the frosts come.

Peas may be planted at the same spacing and watered of course. Last season peas which were staked lasted longer and bore twice as many pods, so for the little extra trouble I was well repaid. I used the twigs and cuttings from the fruit tree prunings put into the ground just as the crop was planted. The young peas made remarkable headway, soon covering the sticks. They seem to grow twice as fast as unstaked ones.

Lettuce must be grown quickly to be at its best; therefore the bed must be rich and well drained. In the hot weather give them as much water as possible, twice a day if convient.

When about 3in. or 4in. across give the whole bed a good dressing of fowl manure say, 1½in. thick, water well, and keep damp. In three weeks one should have a lettuce here and there ready for use. It is a mistake to wait till every one has a hard heart; before they can be used some are wasted.

Carrots do very well if put in a bed that has carried lettuce or some heavily manured crop the year before. Never use manure in a carrot bed and then sow seed. If you do the carrots will fork and twist badly. Ground manured the year before is ideal.

Red beet will do well in nearly any soil if well watered, but this last season I grew some in a very rich bed by way of experiment and they grew as large as saucers in eight weeks.

Turnips and swedes do well if planted in March and get going before it becomes cold.

Onions do well here, but need a lot of weeding.

The sight of a well-kept, flourishing kitchen garden is a pleasure and repays the tedious work of keeping it so.

OWEN.

Jam Making.

At the February meeting papers were read by Miss E. Word and Miss L. Burtt. The Strawberry Jam Competition was won by Miss D. McPharlin with Miss A. Harkness second. Miss Burtt's paper is as follows:—

Summer approaches with one slight relief to the harassed housewife, whose jam shelves or cupboards call for replenishing. Towards the close of the old year only a few varieties might remain and the best jams have disappeared from the collection, hence it is with a thrill and industrious inspiration that the jam maker sets to making her family's choicest and favourite jams. With a contented mind she is then able to have the good stand-by on the table for the forthcoming year—a changeful dish of jam.

A few of the essential rules for successful jam making:—

First and foremost, one must use only the best fruit, which is sound, firm, and slightly unripe. Likewise the best sugar should be used—that, the good crystallised sugar in strict preference to the soft, fine type. In fully ripe fruit the gum-like substance which causes the jam to "set," is converted into sugar. Jams made from late, or over ripened fruit will not set. The usual proportion of sugar is from ¾lb. to 1lb., added for every 1lb. of fruit. Acid fruits, such as oranges and lemons, require more. Before adding the sugar, heat it well by placing it in the oven, as this does not retard boiling processes of the fruit as would eventuate if added when quite cold cold. Fast boiling is an essential factor towards professional jam making. This not only holds the natural colour, but preserves the pieces of fruit and flavour. Only a few, however, specially require long, slow cooking, but this point is particularly stressed in the recipe used. When the jam has bubbles bursting on the surface and will set when tested on plate, it has boiled enough.

Stir as little as possible, as this breaks the fruit, making it into a mash, where as the most tempting jam is that of a good conserve appearance. Unless unavoidable, do not make large quantities at a time, small boilings will cook quicker and be better in every way. Skim carefully. All jams require this process. Many are inclined to think that only citrus fruits require removal of frothy scum, but this is a positive error. Place jam while hot, in clean, perfectly dry, heated jars, and cover directly with whatever preparation desirable, as this renders the jar airtight, enabling longer keeping. Label and date jam neatly, especially if it is to be kept in any quantity for an indefinite period. Never make jam in an iron or tin pan, as these spoil both colour and flavour. Thus, of necessity, one must use either copper, aluminium or enamelled pans.

When huge quantities are made, to cope with the needs of a large family, the most economical method of sealing down is to paste rounds of white paper over the jars using a thin flour paste. The heat of both jars and jam cook the flour rendering the cover airtight. A manufactured glue is similarly effective, although more expensive; whilst perhaps the most adaptable method would be that of using cellophane coverings and air-proof elastic rings. Finally, with regard to storage after these former rules have been carefully studied, observed and adhered to, place the jars in neat rows in a cool, dry—preferably dark—shelf or cupboard, in such a manner that labels can be readily seen.

There is still little need to scan through the recipes of different jams in general, as needless to say, all womenfolk have an unending supply of well written recipes, which give methods in necessary detail. But here is a utilitarian recipe which saves both time and labour, similarly there is no waste:—

Orange Jelly and Marmalade.—6 oranges, 3 lemons, water, sugar, crystallized ginger if desired. Choose clear, thick-skinned fruit, and slice very thinly. Measure and to each cup allow 4 cups of water. Bring to the boil, boiling briskly for 30 minutes.

For the Jelly.—Strain off 2 cups of the clear juice. Bring this to the boil. Add ¾ cup sugar to each cup of juice. Boil rapidly until it gives the jelly test of thick, sheet-like drops from a spoon. Bottle and cover down.

For the Marmalade.—Take the remaining fruit and liquid, measure it, and add ¾ cup of sugar to each cup of mixture, and if liked, 1 tspn. of chopped crystallized ginger to each cup of pulp. Bring to the boil. Boil rapidly until a small quantity sets when tested. Bottle and seal down.

Should smaller quantites of jelly and marmalade be required, use 2 oranges and 1 lemon.

A strong point in favour of this delicious jelly and marmalade, is that it can be made at any time of the day; there is no standing overnight. Moreover, both jelly and marmalade can be made almost simultaneously if you possess two suitable pans.

PENOLA.

At the March meeting Mrs. T. Kidman gave the following paper. Several members also brought recipes for cold left-over dishes.

Using Left-overs.

It is sound and economical for the housewife to use up cold foodstuffs for subsequent meals—particularly for lunch and tea. This economy can be kept well within the rules of good nutrition. The main principle to be observed is that re-heating is quite distinct from re-cooking. If the re-heating is prolonged for any length of time, the food must be enclosed in other material, and all juices should be consumed, so that none of the food value is lost.

Three principal ways of re-heating meat are.—

1. Using in a good gravy, hash, mince, or curry.
2. By protecting from re-cooking by covering with potato or pastry as in Shepherd's pie or as savoury tart.
3. By covering with breadcrumbs or batter—as fritters or rissoles.

As re-heated meat has less flavour than freshly cooked meat, gravy or stock should be used in certain dishes, while trimmings of bacon rind, bones or vegetables will add to the flavour.

All vegetables should be cooked before adding to the meat, which should be placed in the hot gravy and only allowed to be well flavoured therein. To eke out cold meat put it through the mincer, and lay a small amount on each of rounds of scone mixture, roll as for pasties and fry in hot fat or roll and boil as dumplings. Slices of cold meat dipped in batter and re-heated in a frying-pan make a useful dish.

Fry onions until brown and put aside, in the pan in which onions were cooked, heat cubes of cold meat, then add onions, thicken, and serve on buttered toast.

Corned lean meat can be made into a salad by cutting into small cubes and adding thinly sliced onions, salt, vinegar to taste, and just before serving add a little cream.

Left-Over Fowl or Chicken Salad.—Mince fowl and place in bowl, add a little chopped celery and cut up whites of two hard-boiled eggs. Pour over salad dressing and garnish with pieces of beetroot or finely chopped lettuce. Rub yolks of eggs finely and sprinkle on top. Serve immediately.

Devilled Meat.—Put in frying-pan one dessertspoon of butter and one teaspoon curry powder, one dessertspoon vinegar, pepper and salt and a little cayenne or sauce (if liked), and slices of cold meat. Let simmer gently in the mixture, turn over once; do not allow meat to more than reheat or it will be tough. Serve on hot toast.

Left-Over Rice.—A good winter's dish is to add 1 tin of salmon to left-over rice, mix all in a piedish, and garnish if liked, with crumbled hard-boiled eggs. Heat in oven.

Left-over Vegetables.—These take a new lease of life when "pepped up" with a tasty salad dressing. Cold potatoes, carrots, beans, onions, shallots, peas or cauliflower are all suitable. The following salad dressing is excellent for any vegetables on hand.

Salad Dressing.—Yolk of 1 hard boiled egg, ½ teaspoon of salt, 1 tablespoon of cream and one of milk, ½ teaspoon of mustard, 2 teaspoons sugar, ½ cup of vinegar. Pound mustard, egg, sugar and salt together, then work in cream and slowly add the vinegar.

Left-over Bread.—Brown crusts in oven, and then pound with rolling pin; store until needed. This can be used for coating rissoles, fish, &c.

Bread can be made fresh by steaming or baking. To steam place in a steamer over a pan of boiling water, and let it remain there five minutes. To bake—wrap bread in clean wet cloth, place on a sheet in the oven, which should not be too hot. Leave until the cloth is dry, remove and let bread crisp before using.

Dry bread can be used for seasoning. To make a sauce for roast poultry, put saucepan on side of stove with a litle milk, butter, small onion, pepper and salt and pinch of mace and dry bread enough to thicken. Simmer about ¼ of an hour before using.

When a boiled pudding is made, the addition of bread-crumbs makes it lighter. Cooked apples in a pie dish with a layer of breadcrumbs make a quick entree. Fill a piedish with alternate layers of tomatoes, onions, and breadcrumbs with pepper and salt, dot butter on top and bake.

Omelette.—To each egg add one tablespoon bread crumbs, salt and pepper and a little milk. Tomato and meat may be added if liked. Drop in hot fat and fry. If a tablespoon of vinegar is added in proportion to four eggs it will improve flavour and take away any greasy taste.

Bread-Crumb Pudding.—Put in piedish left-over cooked apples or jam to depth of ½ an inch, and cover with about an inch of breadcrumbs and a little cocoanut if desired. Make a custard with one egg, dessertspoon of sugar, one cup of milk. Pour over breadcrumbs and cook. Serve hot or cold.

A delicious pudding can also be made with cake crumbs, any left-over cooked fruit put in bowl, then breadcrumbs with juice of fruit poured over them and allowed to soak while custard is being prepared and cooked. Pour custard over and allow to cool. Left-over sandwiches may be coated, fried and used as savouries.

PINNAROO.

Bottling Meat and Fish.

The following paper was read by Mrs. G. Pearce:—

One of the most difficult problems the housekeeper in the country has to solve during the hot weather is that of providing a regular supply of meat for the table.

The salting of part of a sheep is the method usually adopted to keep it in usable condition and surplus poultry is also useful, but the time always comes when neither of these is available and an unexpected guest or a heat wave will arrive.

It is then that we look to our store cupboard to supply the deficiency, and on a hot day almost everyone enjoys a meal of cold meat or poultry set in jelly.

When a bullock is killed in winter, unless the family is large they grow very tired of beef.

It is then that some can be put in bottles for future use. Even corned beef can be put in bottles. A small roll, either with or without jelly, is very nice for a change later on.

Young roosters may be bottled when at their best, and thus we save feeding them till these are wanted for the table.

A few bottles filled when an extra heavy sheep is killed, and a few more when a pig is killed will add variety.

Rabbits, boned and packed tightly with a firm jelly, are delicious.

Stew, curry, and soup may be made and bottled in the same way as meat.

Fish of all kinds are well worth the trouble of preserving. When going for a holiday camp to the river or seaside carry some of your provisions in Fowler's "Vacola" or Agee "Victory" jars. Jam, butter, or biscuits carry well in them. Take some new rings and lids if necessary and you can bottle your surplus fish to bring home.

Bottles vary in size and shape. Both "Victory" and "Vacola" bottles are good, but the "Vacola" are easier to use on account of the position of the ring.

Fish is packed in bottles without previous cooking. For all other meats cook as usual but do not over-cook. Cut in suitable pieces and pack in bottles. Fill with stock or gravy and add a little gelatine—¼oz. to the pint of stock is the usual quantity for meat and ½oz. to a pint of hot water for fish. Fish should be rubbed with salt before packing in bottles.

Put on ring, cover and clip, being careful that the ring is perfectly straight and not twisted.

A Fowler's outfit is an ideal one for the purpose, being provided with a stand for bottles and a thermometer; but if this outfit is not at hand one may still have bottled meat.

With a Fowler's outfit place bottles in sterilizer (they may touch), fill to three parts height of bottles with cold water. Bring to the boil and boil gently for half an hour. Remove and cool gradually, but do not remove clips. After 48 hours again sterilize, using thermometer and bringing the heat to 200 degrees and keeping it at that temperature for ½ hour. When thoroughly cold remove clips and store.

Without an outfit one can substitute a large billy can or tin boiler. Place a sugar bag, or even a good layer of paper in the bottom of the utensil used, wrap bottles in rag or several thicknesses of paper. Put bottles in boiler, fill a little more than halfway up bottles and boil gently for 30 to 35 minutes.

Remove and cool, and in 48 hours repeat this process, this time boiling for ¾ hour.

Handle the bottles carefully between the two sterilizations and keep as cool as possible. Should rings slip out of place while sterilizing, lift the lid, replace ring and cover and return to hot water and boil again for 10 minutes. The opening of the lid should be done carefully and quickly and as the boiling liquid may boil out when lid is lifted, it is wise to cover the hands with a thick cloth while doing this.

Fowler's bottles may be procured apart from the outfit, but enough bottles to twice fill the sterilizer are given with the oufit.

WILLOWIE.

Mrs. L. N. Mills presided at the April meeting, when two papers were read, "The Home Garden," by Mrs. I. McCallum and "Candies and Bonbons," by Mrs. S. Brooks. Mrs. Brooks' paper was as follows:—

Candies and Bonbons.

Everyone should learn to make some kind of sweets. Parents do their children a great injury by denying them good, pure candies. The child, and the grown-up too, require a large amount of sugar, for these white crystals feed the everburning flame of the body, supplying animal heat, which is life.

The first thing that is required is a proper confectioner's thermometer, so that the syrup may be removed from the fire at exactly the right degree. Such thermometers are made of wood, brass or copper, and the degrees on them should mark not less than 350°.

When required for candy making place the thermometer in warm water so that it may rise gradually, and return it to the warm water on removing from the candy. This dissolves the clinging candy and protects the tube from breaking. Always use the best materials. Candy of the better grade is very largely made up of sugar, with the addition of various colours, flavours, nuts, fruits, butter, starch, and glucose. Glucose is used to prevent the sugar from granulating during boiling. Cream of tartar or tartaric acid may take the place of glucose in some recipes, as this also tends to prevent granulation. When making candies always use fine sugar and learn how to boil it; this is most necessary. Place the sugar in a saucepan, moisten with a cup of water and stir over fire until sugar is dissolved. Do not allow the sugar to boil before it has dissolved; if it boils it will crystallise and the batch will be spoilt. When sugar has dissolved place the lid on the saucepan for two minutes, so that the steam may condense on the sides. Remove the lid, wash off with a brush dipped in warm water any particles of sugar that may have splashed upon the sides of the saucepan. To test without a thermometer, have a cup of cold water ready and when the syrup has been boiling about 10 minutes, drop a small portion into the water, and if it can be worked into a soft ball that will leave the fingers without sticking, it has reached the caramel stage—

240 degrees by the thermometer. Boil until it changes to a deep golden colour and test again; if it snaps it is in the toffee stage—310 degrees by the thermometer. Do not stir the batch unless stated in the recipe. Do not try to make hard-boiled sweets or almond rock on a wet day; choose a nice, fine day.

Recipes.

Plain Toffee.—3lbs. sugar, ¾lbs. maize syrup with 2 cups water. Put on fire and boil to 280 degrees. Pour out into a greased tin and cut in squares when cool enough.

Butterscotch.—Same recipe only boil to 320 degrees. Take off fire, and when it stops boiling, add a ½lb. butter. Heat till well worked in.

Cocoanut Candy.—Same as last recipe, but add ½lb. of cocoanut chips and drop on wax paper. If coloured candy is required, put in colour when beating up.

I often make almond rock or peanut brittle by the same recipe. Boil to 320 degrees if one wants almond rock very dark. Take thermometer out when it reaches 320 degrees and leave a few minutes watching it all the time or it will burn. Put in almonds after it has finished boiling.

Servian Rock.—15ozs. of sugar, 8½ozs. of maize syrup. Moisten; boil to 260 degrees; take off fire, place in basin and beat up white. While getting white, pour in the stiffly beaten white of 1 egg and 1oz. of chopped almonds. Beat until it will not beat any longer. Break into small rocky pieces.

French Cocoanut.—3 cups sugar, ¾ cup milk, 1 cup desiccated cocoanut, 1 tspn. butter, 1 tspn. cocoa, pinch cream of tartar. Boil all together 5 minutes, then take saucepan off fire. Stir until creamy. Pour into a buttered plate, and when cold cut into cubes.

Puff Balls.—Soak 1oz. gelatine in ¾ cup water for 20 minutes. Boil together 1lb. sugar in 1¼ cups water for 10 minutes. Add soaked gelatine and boil 10 minutes. Put mixture in basin and beat till cool and stiff. Spread out on a plate and cut in squares. Roll in Koko Lanka.

Cream Fondant.—This fondant can be used for hand moulded bonbons and makes a most delicious soft cream divided in pieces and flavoured and coloured. 1½lbs. sugar. ½ pint water, add 4ozs. maize syrup when sugar is dissolved. Cover saucepan and steam 2 or 3 minutes. Wash down sides, boil to 242 degrees. When lukewarm add well beaten white of one small egg.

Conference of Women's Branches held at Robe, 13th April

Although there is no Women's Branch of the Bureau at Robe, delegates from Millicent, Rendelsham and Coonawarra, in company with members of the local branch of the Country Women's Association held a very successful Conference at Robe on 13th April.

Mrs. Reschke (Coonawarra) presided. Miss E. Campbell of the Education Department spoke on "Dressing for Health," and the following papers were read:—

Elocution.

[Mrs. E. W. Willshire (Millicent).]

Among the cultured races in ancient times, the study of correct speech was deemed an essential element of a liberal education; therefore elocution was given a place of honour and importance, and many coveted rewards were in store for those who worked hard for them. Elocution was considered quite as important a fine art as painting, music and sculpture. It is often urged that elocution and public speaking do not receive the attention in these days that they should. Elocution has met with indifference and half-veiled contempt at the hands of the directors of many colleges and schools. However, this subject is now obtaining a rank of greater importance and great benefit is derived from a systematic course of correct teaching. The imperfectly taught student of elocution is apt to develop irritating mannerisms both in pronunciation and tone. These render him wearisome to his listeners. He has so little knowledge of correct breathing that he often has serious throat infections and has to seek medical attention.

Elocution serves to strengthen and improve the voice, strengthen the breathing organs, to overcome bad accents and be able to read and recite in a manner pleasant and enjoyable to others. It is not sufficient to learn verses parrot-fashion and then go around inflicting them on long-suffering friends. One must, to attain success, have a love of the subject accompanied by careful practice in articulation, pronunciation and breathing. The emotions and passions must be pondered and analysed, and their appropriate symbols of expression dealt with. The imagination must be trained to apprehend, and the physical powers to render the full force and message of what is to be rendered.

The English word "elocution" is derived from the Latin which means "speaking out." In its technical sense it means speaking with correctness of pronunciation, clearness and intelligent modulation of the voice to convey to the hearers a full and graceful meaning of the words spoken. The aim of an elocutionist should be to acquire the art of accurate and effective delivery. Firstly he must attend to voice and breath control, pronunciation of words and regulation of accent. Secondly, he must study the principles which govern expression in delivery, taking care to modulate the voice where expression marks occur. The ambition of an elocution student should be to excel.

Bad habits in breathing and voice forming are acquired with unfortunate ease, and are hard to cure. Deep breathing exercises are the most beneficial so that the student will have smooth delivery. Care must be taken when reciting that the actual breathing is not heard. Every chance given by ordinary pauses must be taken to maintain a full supply of breath. The true secret of proper breathing is to cultivate a babit of replenishing the lungs at every available opportunity during the recital.

The voice has three separate keys—high, low and middle. The high pitch is rarely used except to express great excitement. The low pitch is of value for solemn occasions. The middle pitch is the one used most frequently and is most satisfactory. An important point in reciting is to be sure one is well heard. Distinctness is more important than loud speaking. A good plan is to watch those seated at the back of the hall and judge from their expressions whether they can hear. Speak clearly, slowly and distinctly. There is no need whatever to hurry, as the audience likes to hear all the words. Keep the mind free from everything except the piece being recited, otherwise attention wanders, and lines are missed. Stand on the platform easily, with hands loosely at the sides. If any actions are to be done, do them gracefully and try not to be stiff. Be thoughtful, be natural, and feel the spirit of the recitation.

Cool Drinks.

[MRS. E. ANDREWS (Rendelsham).]

In considering the subject of cool drinks it should be remembered that the most natural thirst-quenchers are pure water and fruit juices. Most people do not drink sufficient water. The addition of fruit juice to water adds to the palatability; and a considerable variety of flavours may be obtained in this way, thus increasing the quantity of water drunk. The fruit drinks given here have an especial appeal on a hot summer's day, but they may be used to advantage at any time of the year when the fruits are obtainable.

The "pep cocktail" given in this section, containing egg yolk and fruit juices, will be found of great value to brain workers. This is what Dr. H. A. Stockdale calls "pep cocktail." Prepare as follows: Juice of 1 orange, juice of ½ a lemon, raw yolk of 1 egg, 1 tspn. of clear honey. It is important to leave out the white of the egg. This cocktail should be taken ½ hour before breakfast.

RECIPES.

The cool drinks which help to make the summer bearable by quenching the thirst and cooling the system will now be brought into consideration.

Pineapple Fruit Punch.—Mix the juice of a tin of pineapple, juice of 1½lbs. of grapes, 6 lemons, 1 pint pear juice, 1 cup each nectar and ginger wine, sugar to sweeten, and finally, when about to use, add 1 small bottle of soda water.

Ginger Beer (*brewed*).—1oz. cream of tartar, 3ozs. whole ginger, 3lbs. sugar, juice 2 lemons, 2galls. water, ½ cup yeast, white of 1 egg. Bruise ginger well. Mix all together (including ½ lemon rind). Bring to boil for about 10 minutes. Cool and then add yeast and well beaten egg white. Strain well and bottle. Ready for use in 2 days.

Orange Drink.—Slice crosswise 4 oranges and 1 lemon. Put into an earthen jar with 4ozs. sugar. Pour on this 1 quart boiling water and allow to cool.

Home-made Fruit Salts.—2ozs. each tartaric acid and Epsom salts, cream of tartar and carbonate of soda. 1oz. magnesia, ½lb. lemon flavoured icing sugar.

Supper Savouries.

[MRS. STRATFORD (Rendelsham).]

Most women like to serve something unusual and palatable, and especially so to guests at supper. Savouries are preferred by most people in place of too many sweets. There are many tasty savoury dishes that can be made at very little cost. It only requires a little thought to be able to make many dainty dishes from the left-over meat, vegetables, etc., which may otherwise be thrown away.

Sandwiches.—Numbers of different kinds of sandwiches can be made from left-overs and dainty bits from the pantry. Use fresh bread and sweet butter and some fresh crisp lettuce, parsley or cress for garnish. These are a few suggestions for sandwich fillings:—

Grated cheese, diced celery and chopped walnuts mixed together with a little mayonnaise; minced chicken and tomato; cooked brains flavoured with nutmeg, salt and pepper; minced raisins and preserved ginger seasoned with lemon juice. There are many kinds of paste procurable in small tins which are very handy to have in store in case of emergency. Nut meat makes delicious sandwiches. It is a vegetable meat made from nuts and cereals. Marmite is also a vegetable extract which makes tasty sandwiches, and is a rich source of vitamin B.

Eggs.—Egg yolks are rich in mineral salts and in fat-soluble vitamin. The white of eggs are rich in protein, therefore they are wholesome as well as appetising. Following are a number of simply made sandwiches containing egg:

Curried Eggs and Chopped Olives.—Scrambled egg and sliced tomato; sardine and egg yolks; curry and eggs; chopped egg and minced chicken; egg and lettuce; egg and grated onion. Most egg sandwich fillings are improved if flavoured with finely chopped parsely, and sandwiches look much more attractive when garnished with shredded lettuce, sprigs of parsley or cress, or even sliced radish.

RECIPES.

Gem Scones.—To 1 cup of milk add the yolk of 1 egg and a little salt. Beat well, then add very gradually 1½ small cups S.R. flour. Leave until light and frothy, then fold in the stiffly beaten egg whites and bake in hot irons 20 minutes. Irons must be very hot and greased.

Bateaux.—Line small tins or paper patties with pastry. Prick them with a fork and bake until done. When cold fill with this mixture:—Diced tomato and grated cheese, seasoned with salt, pepper and mayonnaise.

Fillings.—Sardines, hard-boiled egg yolks and butter; cooked brains bound with white sauce; mushrooms fried in butter with lemon juice and white sauce. Cooked cold peas and beans with dressing. Minced chicken and grilled steak. Salmon and tomato.

Sao Biscuits.—3 cups plain flour, 1 large tspn. of salt, 1 egg yolk in enough milk to make a stiff dough, roll out very thinly, prick with a fork and bake.

Cheese Ramequins.—Roll out ½lb. puff pastry, line some patty pans and fill with this mixture:—Cream, 2ozs. butter, add 4tspns. flour gradually, 3tspns. milk, 2 well beaten eggs and 2ozs. grated cheese, salt and pepper. Bake in hot oven.

Savoury Bloater Biscuits.—Sift 5ozs. flour, ½tspn. each salt, baking powder and pinch cayenne. Rub in 2ozs. butter, 1½ozs. Make a stiff dough by adding 1 egg yolk and a squeeze of lemon juice. Roll out thinly, bake for 10 minutes in a moderate oven. Spread with butter and paste.

Cheese Wafers.—½lb. puff pastry, juice of 1 lemon, 2ozs. each butter and grated cheese, 1 egg, salt and pepper to taste. Roll out pastry very thinly, cut in halves, put cheese, butter, salt and pepper in a saucepan, drop in egg yolk and make thoroughly hot, add lemon juice, spread this mixture when cool on one half the pastry, cover with the other half, cut in squares, brush over with beaten egg white, bake on greased tray till done.

Pumpkin Scones.—1 cup mashed pumpkin, 2 cups flour, 1 dspn. baking powder, 1 egg, 2tbspns. sugar, 1 heaped tblspn. butter. Cream butter and sugar, add egg, beat well, stir in pumpkin and lastly flour. If too stiff, add a little milk. Roll out lightly, bake as other scones.

Herring Paste.—6 minced herrings, ½lb. butter, 3 eggs, ½ cup milk.

How to Prepare for Shearers.

[By Miss I. Campbell (Rendelsham).]

The following are some hints for the housewife who is going to do the cooking herself or engage a man or woman to do it.

Have a large kitchen, say 20ft. x 12ft. As most shearing sheds are away from the house, it is best to have a shearers' kitchen built near the shed. The stove should be built in one end with a cupboard on one side for crockery and a safe or cupboard for groceries on the other side. Have a table for washing up and a table for mixing and preparing food for cooking against the wall on either side of the room, as near as possible to the cupboards.

The dining table in the other end of the room should be 12ft. long, and placed lengthways in the room to seat 6 men on either side. It is always advisable to keep 1 or 2 places set at the extreme end of table for casual callers. We will cater for 12 men.

If the housewife has her own fruit garden many bottles of preserved fruit such as apricots, plums, peaches, tomatoes, pears and apples can be stored away in readiness. Apples and apricots can be dried on trays in the sun. Sauce and pickles can also be made.

Start a vegetable garden and have cabbages and cauliflowers ready to cut. Peas and broad beans can be planted in June and a little later lettuce and spring onions. It is rather difficult to procure enough vegetables for shearing unless grown for the purpose. For one person to do the cooking, she must have no other duties to do but cook and clean the kitchen. It is most important to be punctual with all meals and not keep the men waiting. Have the meat and vegetable dished, and sauces and gravies made ready to start dishing as soon as the bell rings, and dinners placed back in the oven for late comers. The men like to relax and have a smoke after meals before starting work again.

Dishes must be washed and put away by 2 o'clock so that more scones and cake can be baked for afternoon lunch at 3 o'clock. Vary the scones—plain, sultana, and brown. Cakes which are good are rock cakes, jubilee, tennis, sultana, currant, coffee, 3-minute sponge, jam roll, and many others.

For tea at 5.30 cold meats and salads, sauce, pickles, stewed or preserved fruits, and custards of various kinds. Junkets and jellies are suggested for hot days, and for cooler weather soups and stews, meat pies, pasties, sausage rolls and custard, jam, or currant tarts, cakes, and scones are well liked; also cheese. Puddings are a problem for the midday meal. Clara Pudding, Ginger Sponge Pudding, plain batter, rice custard with stewed rhubarb, apple or apricot pies are among the many useful ones.

When stocking up for one month for 12 men, the following would be needed:—Several plum puddings. 1 bag each of flour, potatoes, sugar, 12lbs. each of curants, and sultanas, 6lbs. raisins, 1lb. lemon peel. 1 tin cocoa, 6lbs. each of dark sugar and salt, 2lbs. carb. soda, 4lbs. cream of tartar, 6lbs. of good clean cooking fat, about 6lbs. butter per week, and about 20 loaves of bread. Three lbs. each of cocoanut, icing sugar, and tea, 1lb. each coffee, pepper, spice, nutmeg, curry, 2 or 3doz. bottles or tins of preserved fruit and 1doz. jelly crystals, and about 2doz. eggs for each day if they are to be used for breakfast.

It is better to have too much than not enough as most things can be used by the household later on.

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All communications to be addressed:
"The Editor, Journal of Agriculture, Education Building, Adelaide."

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A. P. BLESING, *Minister of Agriculture*

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Agricultural Bureau Conferences, 1938

Eyre's Peninsula (West), at Ceduna, date altered to Wednesday, 29th June (Mr. P. S. Morrison, Ceduna).

Upper North, at Appila, Wednesday, 13th July (Mr. E. H. Wurst, Appila).

Pinnaroo Line, at Parilla, Tuesday, 9th August (Mr. J. W. D. Carman, Parilla).

Murray Lands (West), at Karoonda, Thursday, 11th August (Mr. H. J. Elliot, Box 31, Karoonda), Kulkawirra Branch.

Southern, at Strathalbyn, Thursday, 18th August (Mr. Reg. Sissons, Strathalbyn).

Each Conference will commence at 10.30 a.m. Papers and questions for the agenda of any Conference should be submitted about a fortnight before the date on which it will be held.

Pruning Competitions.—McLaren Flat—Friday, 3rd June (Mr. G. R. Roe, McLaren Flat). Lower North (C. M. Roennfeldt, Greenock, Secretary)—Williamstown and Lyndoch, 15th June; Koonunga, 17th June; Light's Pass, 20th June; Greenock, 22nd June; Lone Pine, 24th June; Championship at Light's Pass, 6th July. River Murray (J. J. Odgers, Ramco, Secretary)—Berri, 29th June; Barmera, 30th June; Moorook, 1st July; Cadell, 4th July; Waikerie, 5th July; Championship at Berri, 6th July. Strathalbyn—22nd June (Reg. Sissons, Secretary).

Overseas Wheat Quotations

By courtesy of the New South Wales Marketing Bureau, the South Australian Department of Agriculture is supplied regularly with statements showing overseas quotations for wheat to the nearest eighth of a penny. The accompanying table gives weekly quotations in the State or country of origin of the wheat, and months of shipment or delivery.

Date of Quotation.	Values elsewhere than in Sydney are expressed in English Currency.							
	S. Aus. Wheat.	W. Aus. Wheat.	Manitoba No. 3.	Argentine Wheat.	Karachi Choice White Wheat.	American Hard Winter Wheat.	White North Pacific Wheat.	Russian.
1938.	May. *s. d.*	May. *s. d.*	May. *s. d.*	*s. d.*	May-June. *s. d.*	May. *s. d.*	May-June. *s. d.*	*s. d.*
May 12...	4 1⅛	4 1⅞	5 0⅝	—	3 11⅝	4 6⅝	3 10⅜	—
			June.			June.		
May 19...	4 0⅜	4 1½	4 11⅞	—	3 11¼	4 4¾	3 9⅝	—
								May-June.
May 26...	3 10½	3 10⅞	4 10¾	—	3 8⅝	4 3¼	3 8½	4 1½
	June.	June.			June-July.			June-July.
June 3...	3 9	3 9⅜	4 9⅝	—	3 7⅜	4 1⅛	—	3 6¾

Victorian—Sales (afloat) at 3s. 9d. and 3s. 10⅞d.

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All-Australian Baconer and Porker Competition

The Australian Meat Board recently published the report of the judges on the first series of the All-Australian Baconer and Porker Competitions, the entries for which were judged in London in December, 1937, by Messrs. H. R. Davidson and Jos. B. Swain.

The judges' placings were:—

Baconer Competition.

First, Inspector-General of Hospitals, South Australia.

Second, W. Logie, Victoria.

Third, Kingston Farm Pig Company, Queensland.

Porker Competition.

First, Principal Roseworthy Agricultural College, South Australia.

Second, Inspector-General of Hospitals, South Australia.

Third, Australian Chilling and Freezing Coy., New South Wales.

Baconer Carcass Competition.

Report by the Judges.

The judges reported that judging was carried out in accordance with the standards laid down to comply with the requirements of the Bacon Market in England.

An entry from the Inspector-General of Hospitals, South Australia, came first in the Baconer Competition, with an entry from W. Logie of Victoria, a good second, after which there was a very consistent and small drop in marks all through the remaining entries. The Kingston Farm Pig. Co. was very unlucky with one entry, as a carcass weighing 134lbs. had been lost, leaving only two in the pen. These have been included in the report although they were of necessity disqualified from competing.

A very interesting feature of this competition, in which the average marks for all entries amounted to 66.7 per cent., is that carcasses were generally better than the commercial product, which was not always found to be the case. This indicated the great interest, care and attention given by entrants and was evidence of their desire to give of their best.

The importance of having 3 carcasses in each entry was corroborated by several entries. Not only did this give a better average for marking purposes, but reduced the inevitable risk when pigs, which were to be judged on carcass points only, must be selected alive. In this connection the judges drew attention to an entry where a carcass weighing 160lbs. was undoubtedly the leanest looking carcass of the three when judged on external conformation, but proved to be the fattest when cut through the loin. The judges had come across this relationship on several other occasions and it proved not only the importance of carcass tests but also the necessity of having a fair sample to judge.

While the results were analysed on a Breed basis too much attention should not be placed on this until a large number of results have been obtained. A standard product is what is required by Smithfield, and as there were of necessity considerable variations in management and environment, it might be necessary to use slightly different breed types to arrive at the standard carcass.

Comments on the different points of the judging were:—

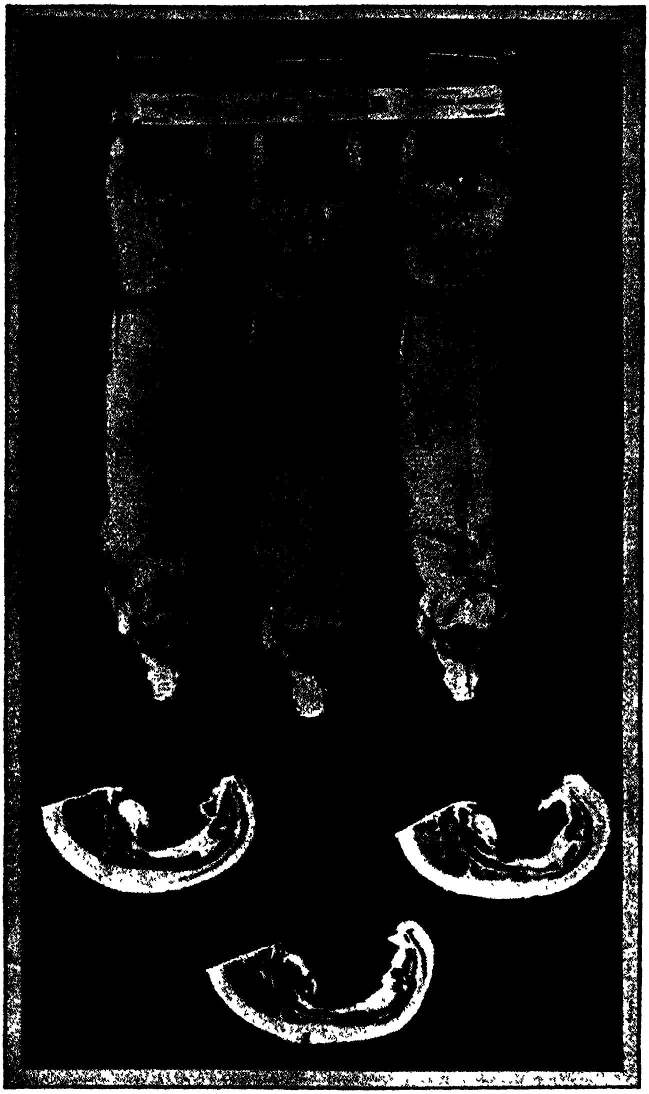
Skin and Colour (5 *marks*).—It was necessary for successful marketing that the carcass should retain its natural bloom and be free of bruise marks, scratches, bites, etc. Even though there might be some doubt as to the cause of these faults by the time the carcasses arrived at Smithfield it was important to draw attention to them. In this direction two entries were reddish in colour and lost a mark each. Another lost marks for a dull blotchy appearance, an entry was bruise marked and one was slightly marked by wrinkles on the skin. One entry only received one mark out of five, as the pigs were extremely dirty in the skin.

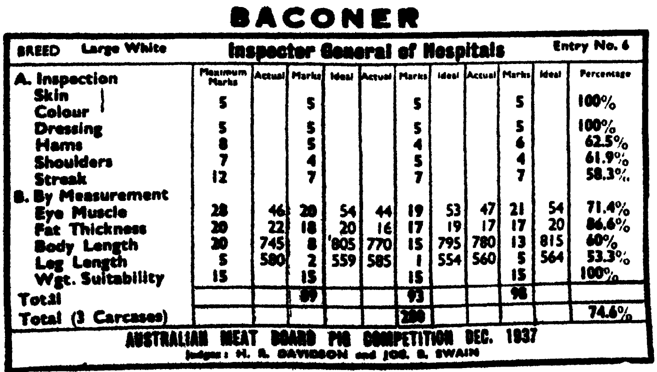
Dressing (5 *marks*).—All entries scored 100 per cent. marks.

Hams (8 *marks*).—The average marks for all entries were 72.3 per cent. and indicated that the Hams were very good. The

Table showing Analysis of Results for Individuals on a Percentage Basis—Baconer Carcass Competition.

Competitor.	Breed Exhibited.	Principal Feeds, etc.	Marks Awarded. (3 carcasses.)	Percentage.
Inspector-General of Hospitals, South Australia	Large White..........	Crushed barley, crushed wheat, crushed peas, skim milk	280	74·6
W. Logie, Victoria	Large White x Large White x Middle White	Barley and boiled potatoes	269	71·7
Kingston Farm Pig Co., Queensland	Large White..........	Buttermilk, maize, pollard, oatmeal; paddock reared, finished last six weeks in pens	261	69·6
J. W. Aldridge, South Australia	Large White..........	Peas, barley and meat meal	258	68·8
Inspector-General of Hospitals, South Australia	Large White x Berkshire	Crushed barley, crushed wheat, crushed peas, skim milk	257	68·5
W. H. E. Crosby, South Australia	Large White x Tamworth x Berkshire	Mixed corn, skim milk, pollard; free range	250	66·6
H. C. Nankivell, Victoria	Large White..........	Pastured, skim milk, boiled potatoes, finished with barley, peas and skim milk	249	66·4
F. Hawtin, Victoria	Large White..........	Milk, pollard, crushed barley; yard feed	246	65·6
J. W. Aldridge, South Australia	Large White x Berkshire	Peas, barley and meat meal	246	65·6
Nestle Anglo Swiss Milk Co., Victoria	Tamworth x Berkshire .	Buttermilk, whey and crushed barley; Indoors from time of birth	240	64·0
J. H. Dawkins, South Australia	Large White x Middle White x Large White	Crushed barley and meat meal	225	60·0
W. G. Burgess, Western Australia	Canadian Berkshire	Wheat	218	58·1
Kingston Farm Pig Co., Queensland. (Not in competition—2 carcasses only.)	Large White..........	Buttermilk, maize, pollard, oatmeal; paddock reared, finished last six weeks in pen	172 (2 carcasses)	68·8





BACONER

BREED Large White	Inspector General of Hospitals									Entry No. 6
	Maximum Marks	Actual	Marks	Ideal	Actual	Marks	Ideal	Actual	Marks	Ideal	Percentage
A. Inspection											
Skin Colour	5		5			5			5		100%
Dressing	5		5			5			5		100%
Hams	8		5			4			6		62.5%
Shoulders	7		4			5			4		61.9%
Streak	12		7			7			7		58.3%
B. By Measurement											
Eye Muscle	28	46	20	54	44	19	53	47	21	54	71.4%
Fat Thickness	20	22	18	20	16	17	19	17	17	20	86.6%
Body Length	20	745	8	805	770	15	795	780	13	815	60%
Leg Length	5	580	2	559	585	1	554	560	5	564	53.3%
Wgt. Suitability	15		15			15			15		100%
Total			89			93			98		
Total (3 Carcases)						280					74.6%

AUSTRALIAN MEAT BOARD PIG COMPETITION DEC. 1937

Judges: H. R. DAVIDSON and JOS. B. SWAIN

BACONER CARCASE COMPETITION.—First Prize Carcases entered by the Inspector-General of Hospitals, South Australia, and Judges' Score Card.

variation in the breed analysis was from 62.5 per cent. to 87.5 per cent. and followed breed characteristics fairly closely.

Shoulders (*7 marks*).—With 68 per cent., this point was not quite so good as Hams, though if one entry with only 47.6 per cent. were omitted, the other entries were very good. It was to be expected that where Hams were good, Shoulders would not be quite so good, and *vice versa*. In illustration of this, the Large Whites had the lowest marks for Hams and highest for Shoulders. The Canadian Berkshires with the highest marks for Hams had the lowest for Shoulders.

Streaks (12 *marks*).—Although this point only scored 60 per cent. the Streaks must be regarded as very good and potentially better than was shown by the marking. They mostly lost marks because they were not thick enough rather than because there was not sufficient lean in them. Had there been a little more fat between the muscles many of the Streaks would have earned full marks.

"Eye Muscle" of Loin (28 *marks*).—The standard set for this point was a severe one as it was most important to encourage its development. An average of 59.3 per cent. of possible marks was accordingly considered a good result. In some cases where the marks for the whole entry were not so good it was found that one poor carcass out of the three was responsible, the others being good.

Back Fat Thickness (20 *marks*).—The results under this heading were very good and were even better than suggested by the average of 66.1 per cent. of possible marks. Although two entries only averaged 48 per cent. of marks, this was not due to too much fat but to too little. A little more finish would probably have enabled these entries to equal another score of 86.6 per cent. or even the top marks (96.6 per cent.) which was the best score the judge had ever recorded under this system from any pen of three pigs.

Body Length (20 *marks*).—It was in respect of this point, on which the average marks of all entries only reached 45.6 per cent. of the possible, that the entries as a whole were deficient. There was, however, great variation, the difference between the best and the worst being 59.7 per cent. Even within one breed, the Large Whites, there was a variation of from 48.3 per cent. to 75 per cent., which brought into prominence two entries with 71.6 per cent. and 75 per cent. respectively. At the other end of the scale the Canadian Berkshires at 13.3 per cent. did not do themselves or the breed justice.

Leg Length (5 *marks*).—At 72.6 per cent. of the possible this point was very good indeed, particularly considering the preponderance of Large White influence.

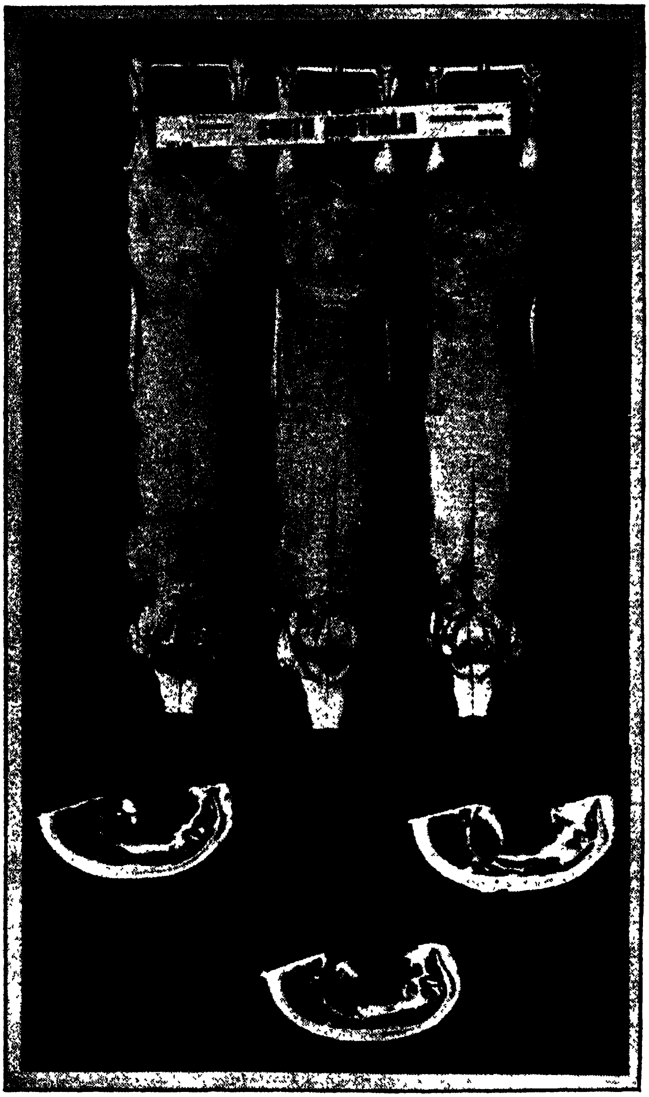
Suitability of Carcass Weight (15 *marks*).—Loss of marks in this section was entirely under the control of exhibitors, as the optimum marks for the most suitable bacon market weights, viz., 135/154lbs. have been published on several occasions and should be well known.

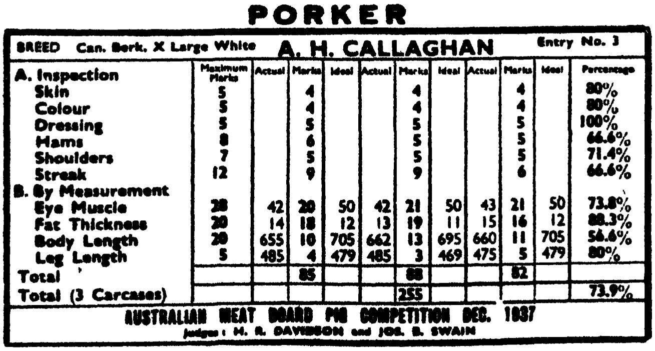
Porker Carcass Competition.

The judging in the Porker Carcass Competition was done in accordance with the standards laid down and included marks for Skin, Colour and Dressing to conform to the requirements of marketing in England.

Skin and Colour (5 *marks each*).—The results of 89.5 per cent. and 87.6 per cent. respectively were very good and losses were accounted for by slight bruises, scratches, bites and a few carcasses coming up a bad colour.

Dressing (5 *marks*) showed an award of 97.1 per cent., all States getting 100 per cent. except one, where a mark was deducted on each carcass because the Hands (Forefeet) were incorrectly tied up, which tended to throw the Shoulders out of shape and possibly helped to cause the low marks on Shoulders.





PORKER

BREED Can. Berk. X Large White **A. H. CALLAGHAN** Entry No. 3

	Maximum Marks	Actual	Marks	Ideal	Actual	Marks	Ideal	Actual	Marks	Ideal	Percentage
A. Inspection											
Skin	5		4			4			4		80%
Colour	5		4			4			4		80%
Dressing	5		5			5			5		100%
Hams	8		6			5			5		66.6%
Shoulders	7		5			5			5		71.4%
Streak	12		9			9			6		66.6%
B. By Measurement											
Eye Muscle	28	42	20	50	42	21	50	43	21	50	73.8%
Fat Thickness	20	14	18	12	13	19	11	15	16	12	88.3%
Body Length	20	655	10	705	662	13	695	660	11	705	56.6%
Leg Length	5	485	4	479	485	3	469	475	5	479	80%
Total			85			88			82		
Total (3 Carcases)						255					73.9%

AUSTRALIAN MEAT BOARD PIG COMPETITION DEC. 1937

Judges: H. R. DAVIDSON and JOS. B. SWAIN

PORKER CARCASE COMPETITION.—Frist Prize Carcases entered by the Roseworthy Agricultural College (Dr. Callaghan, Principal), and Judges' Score Card.

Table showing Analysis of Results of Individual Competitors—Porker Carcass Competition.

Competitor.	Breed Exhibited.	Principal Feeds, etc.	Marks Awarded. (3 carcasses.)	Percentage.
Roseworthy Agricultural College, South Australia	Canadian Berkshire x Large White	Mixture of barley, wheat and peas; mainly outside feeding	255	73·9
Inspector-General of Hospitals, South Australia	Large White x Berkshire	Crushed barley, crushed wheat, crushed peas, skim milk	244	70·7
Australian Chilling and Freezing Co., New South Wales	Large White x Tamworth	Wheat, buttermilk, lime-water, offal and green-feed	227	65·7
E. A. Farr, South Australia	Large White x Large White x Berkshire	Skim milk and crushed barley	225	65·2
W. Logie, Victoria	Large White x Large White x Middle White	Barley and boiled potatoes	210	60·8
Wallace & Son, entry No. 1 Queensland. (1 pig only)	Tamworth x Middle White	Kitchen refuse with meat meal and maize meal	81 (1 carcass)	70·4
Wallace & Son, entry No. 2, Queensland. (1 pig only)	Middle White x Tamworth	Kitchen refuse with meat meal and maize meal	79 (1 carcass)	68·6
G. W. Winch, entry No. 3, Queensland. (2 pigs)	Middle White x Berkshire	Table scraps, Red Comb pig meal, Borthwick's Mebo, no milk; housing, extensive system	137 (2 carcasses)	59·5
G. W. Winch, entry No. 4, Queensland. (2 pigs)	Middle White x Tamworth	Table scraps, Red Comb pig meal, no milk	160 (2 carcasses)	69·5

Hams (8 *marks*).—A result of 69.4 per cent. was quite up to standard and would have been better but for the poor result of one State with only 50 per cent.

Shoulders (7 *marks*).—There was a considerable variation in the States, the average of 63.2 per cent. being quite good.

Streaks (12 *marks*).—An average of 59.1 per cent. was possibly better than it appeared, many marks being lost by thinness, not sufficient fat between the meat.

"Eye Muscle" of Loin (28 *marks*).—The result of 65.9 per cent. was good, although there was a very wide difference in many of the carcasses. Special mention must be made of the winning entry with such level results of 20:21:21 m.ms., with 73.8 per cent. award.

Back Fat (20 *marks*).—An average of 74 per cent. was very good and indicates that the Australian farmer realises that the British public wants lean meat.

Body Length (20 *marks*).—Body Length was not good, although the average of 50 per cent. was pulled down by entries which gained only 31.6 per cent. It was interesting to note that these entries were all crossbred Middle Whites.

Leg Length (5 *marks*).—At 61.9 per cent. was only spoilt by an entry with 40 per cent.

General Remarks.—The pigs were of good marketable quality and the results at 66.9 per cent. for the whole competition were good. Owing to the wide variation of breeds and crossbreds a detailed analysis of results would be unjustified. The consistently low marks, however, for Body Length where the Middle White was used in crossing could not be ignored.

(In regard to the illustrations accompanying this report, the Judges pointed out that owing to inclement weather it was necessary to photograph the carcasses by flashlight instead of by daylight, as is the usual custom. As a result the appearance of the carcass photographs cannot necessarily be taken to be correct as regards colour, shadows and marks generally).

Some Methods of Pig Raising on "Para Wirra"

[Paper read by Mr. J. Howard Dawkins, of Gawler River (President of the Australian Stud Pig Breeders' Association) at the Murray Flats Agricultural Bureau Conference, Cambrai, 6th April.]

Consideration must be given to obtaining the right type of sows. The breed or cross that it is decided to adopt depends on the conditions under which the pigs will be produced; whether they will be kept as a sideline, the distance from market, or whether porkers or baconers will be produced.

The practice followed at "Para Wirra" is to select the best sow at six months old, when her mates are ready for market; at seven to eight months old she is mated and kept on good food until she has her first litter.

Feeding the Sow.

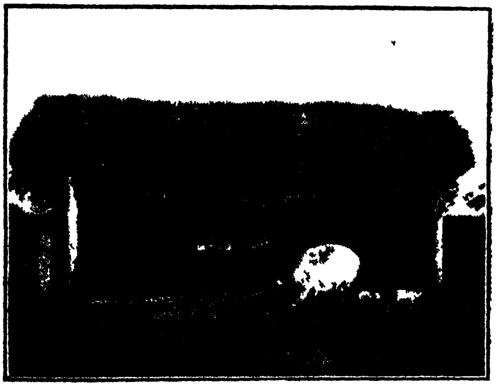
After weaning her piglets, the sow is then turned out with the other pigs and fed as follows:—In winter she has the run of the paddock which contains a mixture of clover and soursob, but mainly the latter. Each sow is given 1lb. of barley a day. In the summer the feeding is lucerne, as much as they will clean up, and a mixture of hay chaff with 1lb. pollard, 1 tspn. of Epsom salts, and 1 of bonemeal. About two weeks before farrowing, the sow is brought into a paddock or yard 3½ chains long and 1½ wide, where there is a shed, water is laid on, and in winter some crop is grown. The sow is then given plenty of clean straw, as much crushed barley as she will eat, and 1lb. meat meal daily until the pigs are born.

Farrowing.

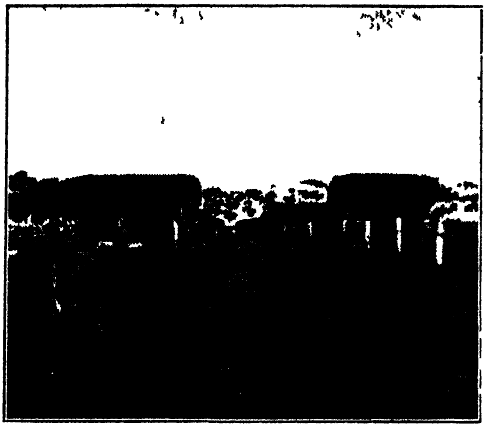
Before farrowing, a rail is placed in front of the shed so that the young pigs cannot wander about until they are two days old. At three weeks the pigs are tattooed, the age booked, and the number each sow has is recorded. The boars are castrated, and as soon as the wounds have healed each pig is sprayed with oil. This keeps down the fleas, kills the tick, and helps the skin. (This is not so necessary on black pigs.) When the piglets are four weeks old they will generally commence to drink some cow's milk; if milk is not available, try them with meat meal.

If the old sow has a self-feeder, the young will usually begin to feed. There are generally two to four litters about the same age, and these are put together in a larger paddock, with a creep in it for the young pigs. By putting them together a lot of time is saved in feeding, and when they are weaned at seven to eight weeks, the young will have settled down and will not fight.

After weaning, the sows are put with the boar, and then turned out in the paddock. There is always a boar running in the paddock to catch any sows that have been missed.



After weaning, the young pigs are kept on milk as long as it is available; when that is short, they are given ¼lb. meat meal per pig daily. When there is an abundance of green feed in the paddock the meat meal is reduced. If the pigs are getting too fat, the meat meal is cut out altogether. At about 4½ months old they are taken into the fattening shed, and usually receive only crushed barley and *clean* water, until they are a little over five months, when they are ready for market



If at any time during the fattening stage the skin is scaly, the pigs must be well oiled. They generally require this when put in the fattening sty. The aim is to get a well finished pig, weighing about 175lbs. live weight. It has been found that when the meat meal has been continued too long the pigs are frequently on the fat side for the ideal type. After the pigs are sold, the age, price, dam and sire and number in litter are entered in a book in order to distinguish the best sows to keep. The aim is to get litters of from 8 to 10; this seems as many as a sow can rear under commercial conditions. A sow is never condemned on her first litter; some have had only 3 in their first, but frequently have 10 in the second.

The following are some of the litters of pure bred sows kept at "Para Wirra": —

	Litters	Reared
Promise, 90, Large White ..	9	7
	13	9
	11	9
	11	8
Rose Bud, Large Black	7	7
	16	7
	8	6
	10	9
½ Large White, ½ Tamworth .	9	8
	10	8
	9	8
	11	10
	9	8
Dam of above, ½ Tamworth (N.B.—This was a long, lean pig) .. .. .. Jan. 1st	13	9
	14	8
	17	8
	17	7
	14	10
	10	8
	10	7
	17	8
	10	8
	11	7
	12	7
	7	7
December, 1936	14	7
Pigs marketed		101

Breeds.

With regard to breeds of pigs, it cannot be too strongly recommended to anyone to commence by buying young sows from a registered breeder, and for a beginning to breed half-breds for market, and to avoid breeding from half-bred sows, but instead have pure blood on both sides. Mendel's law has proved that by this method uniformity is obtained in the offspring. He has also proved that if breeding from half-breds the progeny are likely to be irregular. This has been borne out by the experience of many prominent breeders in this State.

If it is decided to breed pigs for the *porker* market, the pure breeds are Berkshire and Mid York, and these must be sold at a very light weight. It is possible to secure a heavy porker, or light baconer, by crossing the Large White on these breeds. For *baconers* the pure Large White is recommended if one has had experience with pigs, but, if not, pure Tamworth or Berkshire of the Canadian strain can be used, or, better still, sows of one of these breeds could be kept as the dams to be mated to a Large White boar as the sire. The Large Black is a wonderful grower, and if crossed with the Tamworth produces an ideal bacon pig in the Australian climate. The Large Black and

Large White cross-bred animal is of a very nice shape, and is a very rapid grower, but develops irregular dark-coloured spots on the skin.

Feeding.

In feeding pigs the first of the important factors is to see that the man who looks after the animals has plenty of time to do his work thoroughly, and an infallible rule should be never to keep more pigs than can be handled efficiently. Another very important point is to provide *clean* water at all times.

Barley is an excellent grain to feed to pigs, producing pork very cheaply, and its use results in the development of white. firm fat of a quality not equalled when any other starchy material is the principal foodstuff supplied to the animals. The barley should be crushed, and to every 100lbs. of the crushed barley should be added 2lbs. of a mixture made up of 40lbs. slaked lime, 20lbs. salt, 20lbs. bone meal, and 1lb. ferrous sulphate. A good way of making certain that the minerals are thoroughly blended with the crushed barley is to mix the four of them together properly and to feed the mixture into the crusher while the barley is going through In feeding the grain ration a self-feeder saves a lot of time and work, and although some of the animals fatten too quickly when grain is always available, very few have to be sold as porkers when the quick-growing, long pigs already advocated are being reared.

There is no better foodstuff for the economic production of pork, either with porkers or baconers, than skim milk, but unfortunately it is in rather short supply in many districts in South Australia. When the amount available is barely sufficient for requirements, the youngest pigs should be supplied first, and then if any is to spare the older pigs can be given milk as well. About 1½lbs. of skim milk per feed should be given to the younger pigs and the amount increased to 3-4lbs. as the pigs grow older. A useful substitute for skim milk will be found to be wheat pollard, provided it is fed in association with a good meat meal. The amount of pollard recommended is 1½lbs. per feed, and the meat meal should be supplied in troughs so that each individual can take as much as it desires.

Most dairymen in South Australia should be able to produce pigs profitably, because they have the skim milk, and barley is always relatively cheap in this State. In New Zealand pig-raisers use a lot of Australian barley, and besides purchasing the grain, have to pay about 1s. per bushel from wharf to wharf, and even then can produce and export pigs at a profit.

A useful aid in keeping pigs fit and well, which is sometimes neglected, is the maintenance of a full supply of wood charcoal, and when this is always available it does much towards keeping the digestive organs in good order. When pollard is included in the feed, charcoal is absolutely necessary.

Feeding Tests.

To ascertain the gain that the pigs would make under different methods of feeding, 3 pens each containing 6 pigs of an average age of 10 weeks were chosen, the animals being as equal in size and conformation as possible. Each pig was weighed before the commencement of the test.

During the period of the test the pigs were allowed as much barley as they could eat. Pen No. 1 was fed barley and water, Pen No. 2 was supplied with barley and ½lb. of meat meal per head, and the ration of Pen No. 3 consisted of barley and ½lb. per head of liver meal. At the end of 1 month the weekly gain of each pig in the 3 pens was as follows:—Pen No. 1, 9lbs. per pig per week; Pen No. 2, 15lbs. per pig per week; and Pen No. 3, 18lbs. per pig per week. At the end of the second month the pigs were weighed again and had made the following further increases:—Pen No. 1 (one pig died), the other 2 each gained 8lbs. per week; the pigs in Pen No. 2 each put on an additional 18lbs. per week; while in Pen No. 3 each animal increased its weight by 14lbs. per week.

Medicines, Etc.

The most useful medicines are Epsom salts, castor and linseed oils, and nux vomica. When the sow is about to litter, and for the first day after, a little Epsom salts is valuable. In the case of the weak pig in a litter with a stunted appearance, give sufficient castor oil to set the bowels working. This causes them to drink the milk, and they soon recover. With bowel trouble nux vomica is the easiest and least risky to administer, and it has seldom failed, though occasionally Epsom salts have to be given as well.

Certain drugs such as Chenopodium and turpentine are used to rid pigs of worms, but most experienced pig-keepers have come to the conclusion that keeping the pigs in thriving condition is the best preventive treatment.

Pig breeders and pig feeders should subscribe to the Pig Breeders' Annual, an excellent publication containing much useful information.

Power on the Farm.

[A. ASHMAN (Brimpton Lake).]

In this paper no attempt has been made at a comparison between horse power and tractor power on a farm. There are so many factors to be taken into consideration that it is really a matter for each individual farmer to decide for himself. On a farm of from 1,400 to 2,000 acres, which would be the average size of farms in this district, a team of horses worked in conjunction with a tractor would be the most economical power.

The tendency as time goes on appears to be to make tractors heavier and more powerful, and incidentally more costly, and this makes a team of horses necessary if only for the small and lighter jobs. The cost of work done with a team of horses would compare favourably with the cost that would be incurred with a tractor. This is proved by the fact that horse values always appear to be highest when wheat prices are low. I have heard it said that competent horse drivers are becoming harder to obtain, and there is probably some truth in that statement, as generally speaking the rising generation appears to be mechanically minded; but if a farmer is going to pay from £600 to £1,000 for a tractor it will be just as necessary for him to obtain a reliable man to operate his tractor. Of course, where a farmer is doing his own work or is doing it with the aid of his sons, the labour problem is not of so much importance.

There is no doubt that tractors have placed the State many years ahead in the development of our virgin lands, and the time appears to be fast approaching when tractor power will be used on almost every farm in the State. Whether this will be to the benefit of the farmer will depend largely on future prices of the produce.

However, while we are dependent on overseas supplies for our tractor fuels it would be a serious thing for the farmer and the State to allow farm horse power to be neglected to too great an extent.

A Preliminary Investigation of the Relative Effectiveness of Various Chemicals in the Control of Some Common Weeds.

[C. A. Neal Smith, B.Ag.Sc.]

Introduction.

The problem of weed control has always been an important factor in relation to agricultural progress, and becomes of greater significance as the intensity of production increases. The annual loss directly attributable to the development of noxious plants is enormous; in the United States alone it has been estimated at three billion dollars. ([7])

Methods of eradication, in general, fall into three divisions, viz., mechanical chemical, and biological. From the economic aspect, control through competition with more aggressive valuable plants is of outstanding importance, particularly as this method represents one of the main safeguards against re-invasion.

The use of chemical agents for the suppression of weeds is not in itself a recent development, but a great stimulus was given to the question of chemical control of weeds by the discovery of Rabaté ([6]) that sulphuric acid exercised a selective action on certain weeds in winter cereal crops without having any permanent deleterious effect on the cereal itself.

Sodium chlorate has been widely used of recent years, and has proved to be very effective in the control of ragwort in New Zealand. ([3]) Other chemicals, such as various arsenic compounds and ammonium thiocyanate ([1]), have also proved valuable weedicides.

This paper presents the results of three experiments conducted in pots to investigate the effectiveness of the more commonly used plant poisons. In the first two experiments sulphuric acid, sodium chlorate, and arsenic pentoxide were employed in varying strengths, while in the third experiment ammonium thiocyanate was also used.

Experimental Procedure.

Flower pots of 8in. diameter filled with a mixture of sterilised soil, compost, and sand in equal parts were used in the first experiment, while the compost was replaced by loam in the other two tests.

These pots were planted with roots of couch grass (*Cynodon dactylon*), nut grass (*Cyperus rotundus*) and field bindweed (*Convolvulus arvensis*) on 10th January, 1934. The latter grew very poorly, and were replaced by blocks of soil containing roots of *Convolvulus* on 12th February.

For the second experiment seedlings were collected in the field, transferred to boxes in the glasshouse, and later transplanted into the pots. In the third experiment plants collected in the field were placed immediately into the pots.

Four plants were grown in each pot in the first two experiments, and three in the third.

In each experiment the lay-out was that of randomised blocks, and the results analysed accordingly. The experiment used was that designed for spraying prickly pear with arsenical solutions. It consists of a lead cylinder holding the spray solution and an attached delivery pipe of copper. The sulphuric acid was found to have no appreciable action on the copper of the delivery pipe during their brief period of contact. The spray solutions were delivered as a fine spray at a pressure of 80-100lbs. per square inch. Two hundred and fifty millilitres were found to give a satisfactory covering of the foliage of 12 pots, which were equivalent to 210galls. per acre. Allowance for the spray carrying beyond the outside pots was made in computing the area over which the spray fell.

Spraying was carried out under shelter, and the pots were left for two days before being transferred to the open, except in the last experiment, where, owing to excessively wet conditions, the pots were not moved to the open for a fortnight.

Watering was regulated to avoid loss of chemicals by leaching.

To gauge the rapidity of action of the various chemicals, estimations of the percentage of the herbage injured and of the amount and vigour of re-growth were carried out at 1, 4, 7, 14, and 21 days after application.

Four weeks after spraying, all living material was harvested to the level of the soil surface and dried to constant weight at 100° C.

Experiment 1.

Sixty pots of each of the three summer-growing weeds, field bindweed, couch grass, and nut grass, were randomised into 15 groups of four pots, of which one group acted as control.

At the time of spraying, nut grass and couch grass were both at the flowering stage, while the bindweed was still in the vegetative condition. All plants were reduced to a uniform height of 4in., and overhanging runners removed.

The treatments applied on 21st March, 1934, were as follows:—5 per cent., 10 per cent., 15 per cent., and 20 per cent. arsenic pentoxide, 2½ per cent., 5 per cent., 10 per cent., 15 per cent., and 20 per cent. sulphuric acid, 2½ per cent., 5 per cent., 10 per cent., 15 per cent., and 20 per cent. sodium chlorate. The commercially prepared chemical was used in each case.

Results.

Table 1 shows the estimated mean percentage of herbage injured by spray application, and Table 2 the mean yields of oven-dry herbage, four weeks after spraying:—

TABLE 1.—*Estimated Mean Percentage of Herbage Injured by Spray Application on 15th March*, 1934.

Treatment.	Field Bindweed. (*Convolvulus arvensis.*)					Couch Grass. (*Cynodon dactylon.*)					Nut Grass. (*Cyperus rotundus.*)				
	Days after Spraying.					Days after Spraying.					Days after Spraying.				
	1	4	7	14	21	1	4	7	14	21	1	4	7	14	21
5% Arsenic pentoxide.	66	100	100	100	100	4	94	94	94	94	10	66	93	93	93
10% Arsenic pentoxide.	96	100	100	100	100	7	93	93	93	93	12	71	91	91	91
15% Arsenic pentoxide.	91	100	100	100	100	11	94	95	95	95	18	82	92	92	92
20% Arsenic pentoxide.	91	100	100	100	100	15	98	98	98	98	15	88	94	94	94
2½% Sulphuric Acid...	55	56	58	58	58	3	15	24	25	26	10	12	12	12	12
5% Sulphuric Acid....	75	80	81	81	81	11	29	35	40	40	26	31	32	32	32
10% Sulphuric Acid....	100	100	100	100	100	28	79	79	79	79	55	58	62	63	63
15% Sulphuric Acid....	97	99	99	99	99	33	58	60	60	60	56	56	61	63	63
20% Sulphuric Acid....	100	100	100	100	100	27	43	45	45	46	54	58	64	64	64
2½% Sodium chlorate .	4	60	61	61	61	0	74	77	78	78	13	27	48	50	50
5% Sodium chlorate ..	12	83	83	83	83	0	67	71	72	72	5	38	54	58	59
10% Sodium chlorate ..	25	78	79	79	79	1	80	80	80	80	4	40	61	64	64
15% Sodium chlorate ..	71	93	93	93	93	1	80	82	82	82	7	55	64	65	65
20% Sodium chlorate ..	89	97	97	97	97	5	83	84	84	84	6	54	67	67	68

TABLE 2.—*Mean Oven-dry Yields of Herbage Surviving 28 Days After Spraying. (Grams per Pot.)*

Treatment.	Field Bindweed. (*Convolvulus arvensis.*)	Couch Grass. (*Cynodon dactylon.*)	Nut Grass. (*Cyperus rotundus.*)
Nil (Control)..........	3·64	16·30	7·88
5% Arsenic pentoxide	0·08	4·37	4·26
10% Arsenic pentoxide	0·03	4·58	3·30
15% Arsenic pentoxide	0·02	2·68	3·04
20% Arsenic pentoxide	nil	2·37	2·59
2½% Sulphuric Acid...	2·43	14·49	8·11
5% Sulphuric Acid....	1·47	13·14	7·18
10% Sulphuric Acid....	1·65	7·56	5·04
15% Sulphuric Acid....	1·21	12·06	5·23
20% Sulphuric Acid....	1·89	14·13	4·80
2½% Sodium chlorate .	1·37	6·40	5·06
5% Sodium chlorate ..	1·29	4·83	5·52
10% Sodium chlorate ..	0·92	2·73	4·12
15% Sodium chlorate ..	0·94	2·14	4·65
20% Sodium chlorate ..	0·39	1·81	4·84
Standard Error of Mean gms..........	0·232*	1·01*	0·319*

* For the difference between any two figures in any particular column to be significant, it must exceed three times the appropriate standard error.

Field Bindweed.

The action of the sulphuric acid was very rapid, and with 10 per cent. or stronger solutions a complete destruction of the above ground portion was obtained after one day. The lower strengths were not completely effective, and practically no further death occurred after the first day.

Very strong regeneration followed the application of the chemical particularly where the greatest injury resulted. Sulphuric acid was thus ineffective in all strengths in controlling this weed.

Arsenic pentoxide proved the most successful of all treatments. Very marked injury was apparent after one day with complete death on the fourth day and practically no regrowth.

This species proved more resistant to sodium chlorate than the other chemicals. The percentage injury increased with increasing concentration up to a maximum of 97 per cent. with 20 per cent. solution, which was the only strength in which vigorous new growth did not occur.

Couch Grass and Nut Grass.

These species proved much less susceptible to sulphuric acid treatment than did Convolvulus. In both species the amount of foliage damaged was in proportion to the strength of the acid applied up to 10 per cent. while the higher strengths gave no further kill. As in the case of field bindweed vigorous new growth appeared, so that no sulphuric acid treatment was successful.

A high percentage kill occurred after one week following application of arsenic pentoxide, but with all strengths regrowth was considerable though very etiolated in appearance.

Very little injury was evident at the end of the first day in both species following sodium chlorate treatment, but by the end of the fourth day maximum injury had been exhibited in couch grass. Nut grass showed gradually increasing injury with very little difference between the various strengths of chlorate applied. The amount of regrowth was small in each case, but in neither case could sodium chlorate be considered effective.

Experiment 2.

Five common weeds, viz., Cape weed (*Cryptostemma calendulaceum*), soursob (*Oxalis cernua*), barley grass (*Hordeum murinum*), wild oats (*Avena fatua*), and wire weed (*Polygonum aviculare*), together with wheat (*Triticum vulgare*), were subjected to the following treatments on 26th and 27th June, 1934:—2½ per cent., 5 per cent., 7½ per cent., and 10 per cent. sulphuric acid, 1¼ per cent., 2½ per cent., and 5 per cent. arsenic pentoxide, and 2½ per cent. and 5 per cent. sodium chlorate.

These concentrations were adopted because from the results of the previous experiment there appeared to be little justification for using solutions stronger than 10 per cent., and also because it was considered that these plants might be more susceptible to the effect of chemicals. Wheat was included in order to investigate particularly its reaction to sulphuric acid treatment.

Results.

Tables 3 and 4 show the estimated mean percentage of herbage injured by spray application and the mean oven-dry weights of living herbage three weeks after spraying respectively.

Cape Weed and Soursob.

The effects of spraying with sulphuric acid were evident very soon after application, particularly in the case of Cape weed where, after half an hour, the leaves had lost all their green colour and changed to dark brown. Both this species and soursob proved to be very susceptible, and from Table 3 it will be seen that a high percentage injury resulted after one day. Renewed growth occurred in both species, but not to nearly the same extent as in the species treated in the first experiment. The amount of regrowth varied inversely as the strength of acid applied.

The effects of arsenic pentoxide treatment were slower in manifesting themselves, but by the end of the second day discolouration of the leaves was evident in both species. After three days, the mortality was high, being 97 per cent. for Cape weed and 86 per cent. for soursob with the 5 per cent. solution. No regrowth took place following treatment with arsenic pentoxide.

Sodium chlorate, particularly the 5 per cent. solution, proved markedly toxic to both species. The lower strength was not sufficiently strong to kill the Cape weed completely, and the percentage injury was only 49 per cent. In the case of soursob, a small amount of regrowth occurred, but it was practically negligible.

Wire Weed.

The action of sulphuric acid on this species is interesting. The stipules present appear to aid the lodging of the acid in the leaf axils. From here it penetrates the stems, causing their collapse, followed by that of the petioles, and finally the base of the leaves. Chlorophyll is destroyed, and later the leaves fall. Wire weed was almost completely killed by all concentrations, and no regrowth took place.

As with Cape weed and soursob, wire weed proved very susceptible to treatment by arsenic pentoxide, and it was completely killed by the 5 per cent. solution. No regeneration followed the arsenic pentoxide applications.

Sodium chlorate proved toxic in both strengths to wire weed, but neither strength effected a complete kill.

TABLE 3.—*Estimated Mean Percentage of Herbage Injured by Spray Application.*

Treatment.	Wheat. (*Triticum vulgare.*)				Soursob. (*Oxalis cernua.*)				Cape Weed. (*Cryptostemma calendulaceum.*)				Wire Weed. (*Polygonum aviculare.*)				Wild Oats. (*Avena fatua.*)				Barley Grass. (*Hordeum murinum.*)			
	Days after spraying. 1	3	7	14	Days after spraying. 1	3	7	14	Days after spraying. 1	3	7	14	Days after spraying. 1	3	7	14	Days after spraying. 1	3	7	14	Days after spraying. 1	3	7	14
2½% Sulphuric Acid	14	21	26	28	19	31	44	44	66	75	77	78	2	5	17	56	—				—			
5% Sulphuric Acid	25	30	36	39	50	73	80	83	78	79	80	80	3	11	22	68	25	28	32	39	16	19	24	26
7½% Sulphuric Acid	38	47	54	54	59	79	89	95	97	98	99	100	19	45	76	96	37	44	44	47	50	58	62	62
10% Sulphuric Acid	51	55	61	63	54	68	79	81	96	98	98	98	6	19	62	77	56	59	59	60	43	53	58	59
1¼% Arsenic Pentoxide ...	0	3	55	66	0	55	100	100	10	80	96	98	0	65	91	95	0	1	39	46	0	0	34	50
2½% Arsenic Pentoxide ...	0	1	72	78	0	61	100	100	17	86	92	95	1	63	83	88	0	1	71	77	0	1	56	65
5% Arsenic Pentoxide	1	29	89	100	1	86	100	100	73	97	100	100	1	23	98	100	1	9	92	98	0	1	69	79
2½% Sodium Chlorate	1	2	25	53	0	45	96	98	6	34	38	49	0	38	80	80	0	0	6	11	1	2	14	50
5% Sodium Chlorate	0	1	40	58	0	46	98	100	0	54	69	91	0	45	74	74	0	0	11	25	0	1	10	53

Avena and Hordeum were not sprayed with 2½% sulphuric acid.

TABLE 4.—*Mean Yields of Oven-dry Herbage Surviving after Treatment and Harvested 18th July, 1934. (Grams per Pot.)*

Treatment.	Wheat. (*Triticum vulgare.*)	Soursob. (*Oxalis cernua.*)	Cape Weed. (*Cryptostemma calendulaceum.*)	Wire Weed. (*Polygonum aviculare.*)	Wild Oats. (*Avena fatua.*)	Barley Grass. (*Hordeum murinum.*)
Control	8·97	2·88	4·83	2·07	4·18	4·40
2½% Sulphuric Acid	4·30	1·34	0·49	0·22	—	—
5% Sulphuric Acid	3·44	0·19	0·41	0·03	1·48	3·27
7½% Sulphuric Acid	2·72	0·05	0·02	Nil	2·01	1·02
10% Sulphuric Acid	1·37	0·12	Nil	0·02	0·60	1·24
1¼% Arsenic Pentoxide ...	1·13	0·01	Nil	0·05	1·69	1·55
2½% Arsenic Pentoxide ...	0·54	0·01	0·10	0·16	0·09	0·61
5% Arsenic Pentoxide	Nil	Nil	Nil	Nil	0·01	0·42
2½% Sodium Chlorate	1·25	0·02	0·58	0·17	1·74	0·53
5% Sodium Chlorate	1·24	0·02	Nil	0·21	1·85	0·77
Standard Error of Mean	0·390	0·311	0·250	0·073	0·449	0·432

Barley Grass, Wild Oats, and Wheat.

The gramineous species proved much more resistant to sulphuric acid application than the Cape weed, wire weed, and soursob, although all three suffered severely with the strongest treatment. The percentage injury was proportional to the strength of the acid applied. No additional growth followed acid treatment, and even wheat had not recovered within three weeks from the depressing effect of the 2½ per cent. treatment.

Unlike soursob and Cape weed, little evidence of toxicity by arsenic pentoxide was apparent three days after application, but by the seventh day considerable injury was manifest, and the resulting mortality varied, finally, in proportion to the strength of application. Wheat and wild oats were completely killed by the 5 per cent. solution.

All three species exhibited some degree of resistance to sodium chlorate, and this was particularly marked in wild oats, where the estimated percentage injury after 14 days with the 5 per cent. solution was only 25 per cent.

Experiment 3.

Two species, *Myagrum perfoliatum* and three-cornered jack (*Emex australis*), in addition to those treated in the second experiment, were sprayed on 21st September, 1934.

Myagrum is a cruciferous weed of cultivated land, and is proving troublesome in wheat crops in certain parts of South Australia, whilst three-cornered jack is a common weed of waste, as well as of cultivated land. Wild oats and barley grass had reached the flowering stage, but inflorescences were removed as they appeared.

The following treatments were applied:—5 per cent. and 10 per cent. ammonium thiocyanate, 10 per cent. "Weedex," 5 per cent. sodium chlorate, 5 per cent. arsenic pentoxide, and 5 per cent. sulphuric acid. The spraying was carried out under fine and cool conditions.

Results.

Tables 5 and 6 show the estimated mean percentage of herbage damaged by spray application and the mean oven-dry weights (in grams) of herbage from both species four weeks after spraying.

Cape Weed and Soursob.

Marked injury within a few hours followed treatment with both strengths of ammonium thiocyanate, and the two species were completely killed by the 5 per cent. and 10 per cent. solutions.

Sulphuric acid, as in the previous test, was very severe on Cape weed and soursob but, as before, regeneration took place, so that this treatment was not completely effective. Ten per cent. "Weedex," 5 per cent. sodium chlorate, and 5 per cent. arsenic pentoxide each completely controlled these species.

Wire Weed.

Wire weed was completely killed by 5 per cent. arsenic pentoxide and by 10 per cent. ammonium thiocyanate, while sulphuric acid caused the collapse of the stems and death of leaves as in the previous experiment so that a very satisfactory measure of control resulted. Five per cent. ammonium thiocyanate was also effective, although this strength did not give full control. This species showed some measure of resistance to 10 per cent. "Weedex" and 5 per cent. sodium chlorate application where the percentage of herbage injured was only 39 per cent. and 54 per cent. respectively.

TABLE 5.—*Estimated Mean Percentage of Herbage Injured by Spray Application on 21st September, 1934.*

Species.	Treatment.					
	5% Am. thioc.	10% Am. thioc.	10% "Weedex"	5% Sod. chl.	5% Ar. pent.	5% Sul. acid.
Wheat—*Triticum vulgare*.—						
Days 1	2	5	—	—	3	33
4	23	18	11	27	64	46
7	26	27	13	36	76	48
14	41	77	21	48	99	49
21	75	100	36	63	100	49
Soursob—*Oxalis cernua*.—						
Days 1	87	99	18	—	1	83
4	100	100	100	85	100	95
7	100	100	100	100	100	95
14	100	100	100	100	100	98
21	100	100	100	100	100	98
Cape Weed—*Cryptostemma calendulaceum*.—						
Days 1	51	62	12	22	57	78
4	62	81	53	48	100	79
7	71	85	56	49	100	79
14	100	100	74	90	100	80
21	100	100	98	100	100	86
Wire Weed—*Polygonum aviculare*.—						
Days 1	4	8	2	1	6	31
4	63	67	27	23	79	77
7	73	78	32	29	88	80
14	79	91	37	37	99	83
21	84	100	39	54	100	88
Wild Oats—*Avena fatua*.—						
Days 1	1	1	0	—	2	18
4	25	20	3	5	52	32
7	31	28	4	8	66	34
14	61	94	8	17	97	42
21	76	100	14	28	99	42
Barley Grass—*Hordeum murinum*.—						
Days 1	—	—	—	—	2	31
4	7	14	8	19	19	43
7	18	25	22	41	38	47
14	46	70	38	57	58	52
21	58	95	65	90	74	53
Myagrum perfoliatum.—						
Days 1	11	13	—	—	10	42
4	86	90	7	16	64	86
7	95	100	12	32	89	90
14	100	100	23	61	100	100
21	100	100	43	77	100	100
Three-Cornered Jack—*Emex australis*.—						
Days 1	53	—	—	24	46	48
4	80	—	—	68	95	78
7	86	—	—	79	100	84
14	100	—	—	87	100	85
21	100	—	—	100	100	85

TABLE 6.—*Mean Oven-dry Weights in Grams of Herbage Surviving after Treatment and Harvested from each Species Four Weeks after Spraying.*

Treatment.	Wheat. (*Triticum vulgare.*)	Soursob. (*Oxalis cernua.*)	Cape Weed. (*Cryptostemma calendulaceum.*)	Wire Weed. (*Polygonum aviculare.*)	Wild Oats. (*Avena fatua.*)	Barley Grass. (*Hordeum murinum.*)	*Myagrum perfoliatum.*	Three-Cornered Jack. (*Emex australis.*)
Control	6·27	0·29	3·74	5·38	3·13	4·26	3·05	3·20
5% Ammonium Thiocyanate	0·46	Nil	Nil	0·30	0·19	1·21	Nil	Nil
10% Ammonium Thiocyanate	Nil	Nil	Nil	Nil	Nil	0·11	Nil	—
10% "Weedex"	1·63	Nil	Nil	1·09	1·18	0·55	0·48	—
5% Sodium Chlorate	0·51	Nil	Nil	0·74	0·94	0·21	0·09	Nil
5% Arsenic Pentoxide	Nil	Nil	Nil	Nil	Nil	0·48	Nil	Nil
5% Sulphuric Acid	1·87	0·03	0·68	0·16	1·09	2·19	Nil	0·49
Standard Error of Mean	0·251	0·025	0·232	0·213	0·316	0·331	0·180	0·309

Myagrum and Three-cornered Jack.

Both species were completely killed by 5 per cent. and 10 per cent. ammonium thiocyanate and 5 per cent. arsenic pentoxide.

Sulphuric acid was particularly effective on *Myagrum*, and no regrowth followed treatment, while three-cornered jack, although exhibiting considerable injury, gave rise to vigorous new growth. Five per cent. sodium chlorate gave almost complete control of both species, but 10 per cent. "Weedex" was less effective when applied to *Myagrum*. *Emex* was not sprayed with the latter weedicide.

Barley Grass, Wild Oats, and Wheat.

These species exhibited some degree of resistance to the application of 5 per cent. ammonium thiocyanate but were almost completely killed by the 10 per cent. solution.

Five per cent. sulphuric acid was ineffective with all three species, but as before, there was no sign of recovery in the wheat plants in the period of four weeks.

Wheat and wild oats succumbed to 5 per cent. arsenic pentoxide while barley grass was very severely affected.

Neither 10 per cent. "Weedex" nor 5 per cent. sodium chlorate gave a satisfactory measure of control of these species, though causing severe injury to all three.

The gramineous species appear to be more resistant to sulphuric acid and sodium chlorate treatments than the non-gramineous species, which is in agreement with other findings. (4) In Table 7 the ratio of the weights of herbage of test pots to control pots expressed as unity for 5 per cent. sulphuric acid and 5 per cent. sodium chlorate treatments for each species in the second and third experiments is given:—

TABLE 7.—*Ratio of Weights of Herbage (Grams per Pot) of Test to Control (as unity) for 5 per cent. Sulphuric Acid and 5 per cent. Sodium Chlorate Treatments (Second and Third Spraying Experiments).*

	5% Sulphuric Acid.		5% Sodium Chlorate.	
	2nd Expt.	3rd Expt.	2nd Expt.	3rd Expt.
Wheat—*Triticum vulgare*	0·38	0·30	0·14	0·08
Soursob—*Oxalis cernua*	0·07	0·10	0·01	Nil
Cape Weed—*Cryptostemma calendulaceum*	0·09	0·18	Nil	Nil
Wire Weed—*Polygonum aviculare*	0·01	0·03	0·10	0·14
Barley Grass—*Hordeum murinum*	0·74	0·35	0·17	0·05
Wild Oats.—*Avena fatua*	0·35	0·51	0·44	0·30
Myagrum perfoliatum	—	Nil	—	0·03
Three-Cornered Jack—*Emex australis*	—	0·15	—	Nil

It will be observed that in general the ratios for the gramineous species are high in comparison with the others. The greater susceptibility of barley grass to sodium chlorate in the third test as compared with the second may be connected with the advanced growth stage of the plants. Wire weed is seen to resemble the grasses in its resistance to chlorate treatment.

Discussion.

It would appear from the results of these experiments that all the herbicides tested can be used with success to control certain annual winter weeds, but arsenic pentoxide and ammonium thiocyanate are effective over a wider range of species than sodium chlorate, "Weedex," and sulphuric acid.

The latter chemical successfully controlled wire weed, *Myagrum,* and to a lesser extent Cape weed but, owing to its localised action, is not toxic to perennial weeds with deeper and more extensive root systems.

Sodium chlorate is effective on Cape weed, soursob, *Myagrum,* and three-cornered jack, but cannot be used with success on the other species tested (wild oats, barley grass, and wire weed).

On the other hand, arsenic pentoxide and ammonium thiocyanate killed all the species on which sodium chlorate was effective, and in addition destroyed wild oats, barley grass, and wheat.

Where it is completely effective as a weedicide, sulphuric acid possesses certain advantages as it does not affect the subsequent growth of cultivated plants, while sodium chlorate and arsenic pentoxide cause a varying period of sterility depending on moisture and temperature conditions. (^{5})

Arsenic pentoxide was the only chemical to kill field bindweed, and although no treatment was entirely successful on couch grass, this herbicide effected the greatest degree of control. Nut grass proved resistant to all herbicides in this experiment, but by an application of salt to the soil surface at approximately 2lbs. to the square foot at the commencement of growth in the spring, a small area of this species was completely controlled at the Waite Institute.

In each of these experiments only a single application of herbicide was given, and a very much greater measure of control of couch grass and nut grass might have been obtained with additional spray applications. Weed control by the application of chemicals is an expensive method and the ultimate measure of control obtained must be of sufficient value to repay the expense of treatment. It does not appear that chemical control of either species would be an economic proposition except on very small areas, and where soil sterility is of no consequence.

Owing to its sterilising effect upon the soil, the use of arsenic pentoxide on a field scale, except in very low concentrations, must be strictly limited. Ammonium thiocyanate renders the soil sterile for a much shorter period than sodium chlorate (^{2}) and arsenic pentoxide. Further trials of this chemical would be justified, particularly on account of its value as a nitrogenous fertiliser. Difficulty has, however, recently been experienced in obtaining this chemical. (^{8})

The possibility of using solutions of lower concentrations than adopted in these tests is suggested by the results. Sodium chlorate, arsenic pentoxide, and ammonium thiocyanate, where successful, were as effective at the lowest concentration as at the highest. Sulphuric acid, although ineffective at 2½ per cent., gave little further control at concentrations above 5 per cent.

It must be borne in mind, however, that under pot conditions a better application of the spray to individual leaves was possible than under field conditions. Moreover, the rate of application normally recommended is 100galls. to the acre for a successful covering of the foliage, while the rate of application in these tests was double that amount. The 5 per cent. solution used at 200galls. per acre would, therefore, be equivalent to a 10 per cent. solution if applied at only 100galls. per acre. The optimum relationship between strength of solution and rate of application might profitably be investigated.

Summary.

1. Pot experiments to test the effectiveness of various herbicides on certain common weeds were conducted at the Waite Institute.

2. No spray treatment gave a sufficient measure of control of couch grass or nut grass, while arsenic pentoxide was the only chemical to control field bindweed satisfactorily. Sulphuric acid proved ineffective on these deep-rooted perennial weeds owing to the vigorous regeneration which followed treatment.

3. A 5 per cent. solution of sulphuric acid proved very effective in the control of certain annual weeds, viz., Cape weed, wire weed, soursob, and *Myagrum perfoliatum.*

4. Arsenic pentoxide (1¼ per cent.), sodium chlorate (2½ per cent.), and ammonium thiocyanate (5 per cent.) successfully killed the above four species, as well as three-cornered jack, except that wire weed proved to some extent resistant to sodium chlorate. Ten per cent. "Weedex" did not prove as drastic on these weeds as the other herbicides employed.

5. The gramineous species tested, viz., wild oats, barley grass, and wheat, proved more resistant to sodium chlorate and sulphuric acid applications than the non-gramineous species, but 2½ per cent. arsenic pentoxide and 10 per cent. ammonium thiocyanate were completely toxic to all three.

6. The possible use of each herbicide is briefly discussed.

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Pink Eye in Sheep

[By R. H. F. MACINDOE, B.V.Sc., M.R.C. S., (Deputy Chief Inspector of Stock).]

Pink Eye in sheep is an infectious disease, due to germ infection, and causes a temporary blindness, usually clearing up in about three weeks. It may, however, persist for another two or three weeks, before the sight is fully restored.

It usually makes its appearance in the hot, dry weather when the feed is dry. It was, at one time, thought to be due to injury by grass stalks, seeds, or by the pollen of grasses, but though occasionally grass seeds do cause injury by lodging beneath the eyelids, in individual sheep, in such cases the disease is restricted to one or two sheep, whereas the infectious form will spread rapidly throughout the flock commencing with one or two and within 8-10 days, half the flock may become infected.

Though experimentally the disease can be conveyed to healthy sheep, by instilling the tears from an affected sheep, the identity of the germ responsible has not yet been established.

The symptoms develop about 48 hours after the animal has become infected, but may not develop for five days and no doubt flies are prominent in carrying this disease from infected sheep to healthy ones.

Symptoms.—Symptoms can be divided into three recognised stages. The first stage is characterised by excessive watering of the affected eye or eyes, which is sufficient to wet the eyelashes and run over the face. The animal shows a dislike to bright light, and blinks the affected eye continuously, while a little matter may be noticed in the corner of the eye. The eye is inflamed and its blood vessels show out prominently.

In the second stage, the clear portion of the eye (the pupil) gradually becomes smoky-looking, and ultimately becomes covered with a white film, which is surrounded by intense inflammation. The eyelids are swollen, and there is a discharge of matter (pus) from the eye and the animal is blind. The blindness is developed in about 11 days, from onset of symptoms, and then the inflammation commences to decrease—the white film to disappear about the 14th day after onset of symptoms—and in 21 days there may be total recovery.

A third stage, however, may develop in the more severe cases, in which ulcers appear, and may persist for a further three weeks.

Eyes which have been affected develop an immunity, but both eyes are not always affected and the non-infected eye is readily susceptible to infection.

Treatment.—Being an infectious condition the first thing that should be carried out is to separate affected from non-affected sheep, and place them in as shady a paddock as possible, with plenty of water and feed available.

Pink Eye (Contagious Ophthalmia) does not kill sheep directly, but indirectly, because affected sheep, being blind, may run into obstacles such as fences, posts, tree butts, or down cliffs, and break their necks or inflict such injuries that they have to be destroyed. It is, therefore, essential to place them in paddocks free of obstacles, and well fenced. When handling them, do so quietly and do not use dogs.

The worst feature of this disease is the loss of condition in affected sheep. So far as medicinal treatment is concerned, it is questionable whether the use of eye lotions or ointments is economically sound as it means individual handling of the sheep at least four or five times, and this means that in the handling there is a great risk of their being injured. However, if treatment is to be given, it is suggested that the whole flock, when being handled to separate the affected from non-affected sheep, should all receive treatment, whether showing symptoms or not.

When the affected sheep have been separated and medicinal treatment is to be given, the following lotions or ointments are recommended:—

(1) Zinc Sulphate solution. Dissolve 1 dessertspoonful of Zinc Sulphate in half a pint of boiled rain water.

(2) Yellow Oxide of Mercury ointment, 2 per cent. strength.

Three or four drops of the lotion can be instilled into the eyes by means of an eye dropper, or in the case of a big flock, a new oilcan in which the ejection of the liquid is controlled by means of thumb spring. It is quick, effective and keeps the lotion free of contamination with dust.

The ointment is applied by inserting a piece, about the size of a pea, between the eyelids and then gently smearing over the eye by moving the eyelid with the fingers.

One treatment is beneficial, but it is advisable to apply treament four or five times daily or at intervals of two days.

Wireless Talks

Summary of addresses broadcast from Stations 5CL and 5CK.

Some Useful Native Plants of South Australia

[By G. H. Clarke (Botanist, Waite Agricultural Research Institute).]

In this talk it is proposed to deal with native vegetation from the point of view of its usefulness to the pastoralist, and not from that of its value as a source of raw materials for purposes of export or manufacture. It is not that South Australia is lacking in plants of commercial importance; it is true that we have no very great natural resources as regards timber, but certain of our plants nevertheless have undoubted possibilities of industrial use. Some members of the sedge or rush family, for example, yield valuable fibre, and are suitable for making such things as rope, binder twine, brushes, and even paper. The bark of the Golden Wattle, *Acacia pycnantha* provides excellent tanning materials, and essential oils can be distilled from the leaves of several species of *Eucalyptus*. The wood of many of our native trees is beautifully grained, and when polished is highly ornamental and eminently suitable for cabinet making. But, with one or two exceptions, the native shrubs and trees of South Australia have not been subjected to the same demands for commercial purposes, as have been made on the forest flora in certain other States of the Commonwealth.

From the point of view of the pastoral industry it is fortunate that this has been so. The establishment of any industry, or of an export trade, which requires ever-increasing supplies of a particular plant and draws the whole of its supplies from the natural vegetation, whilst making no provision for the care and regeneration of the species used, must always be regarded with a certain amount of distrust.

Unrestricted access to virgin scrub, for timber-getting or similar purposes, too often fosters a spirit of irresponsibility and carelessness, and may lead to a destruction of tree life which is largely unwarranted. And it is a matter for particular concern if the plants sought after are trees forming dominant elements of the natural vegetation of the dry interior.

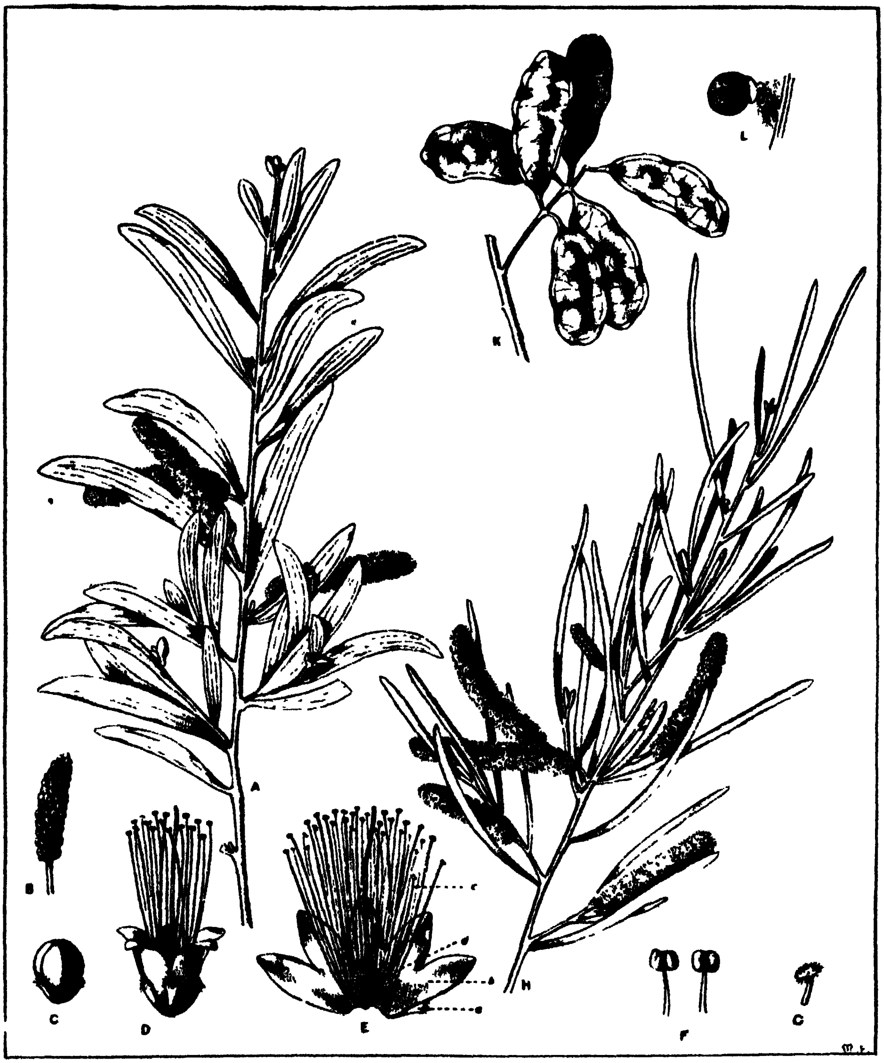
Two cases are deserving of special mention. First, there is the Fragrant Sandalwood *Eucarya spicata*, from the wood of which Sandalwood Oil is obtained by distillation. Thousands of tons of this wood were exported annually from Western Australia during the early years of that colony, and it is still being exported, though in smaller amounts, both from the West and from South Australia. Though the pulling of Sandalwood is now subject to certain restrictions, this was not achieved until after the tree had been rendered almost extinct over large areas where, at one time, it grew in great abundance.

The second instance is that of the Mulga, *Acacia aneura*, the timber of which has become greatly prized for the manufacture of ornaments. In response to an increasing popular demand for these articles an industry has grown up during recent years. While the demand for Mulga wood may not be large enough, as yet, to threaten seriously the survival of the Mulga as the dominant tree of the Mulga scrub vegetation of Australia, an enormous destruction of trees is already taking place in certain areas, much of which is unnecessary and could be avoided by the use of greater care in the selection and cutting of the trees. I have been informed that, out of every 200 tons of Mulga wood delivered to the trade, only about 50 tons are suitable for its purpose, the remainder being waste, and representing useless destruction due to lack of knowledge and to carelessness on the part of some of those engaged in cutting the wood.

Now the Mulga is one of the most important trees found in the interior of Australia. Not only does it provide welcome shade from the glare of the sun, but also it offers valuable feed for stock during dry periods. But, more important than these, it is the dominant tree of a particular type of vegetation which covers considerable areas of subarid pastoral country. This means that its disappearance would alter the character of the vegetation more profoundly and adversely, than would the destruction of the smaller shrubs and herbs which normally grow in association with it. And what is true in this respect of the Mulga is more or less true also of trees in general. As dominant elements trees stabilise the vegetation in the regions where they grow; very often they are the sole plants to survive long periods of drought, and the dropping of their leaves provides the only possible feed for stock during such periods. Their survival gives permanence to the vegetation in such regions, so that the preservation of the vegetation itself is largely dependent upon the preservation of its tree components.

MULGA.—Between Barringun and Enngonia.
(From *Forest Flora of N.S.W.*, J. H. Maiden.)

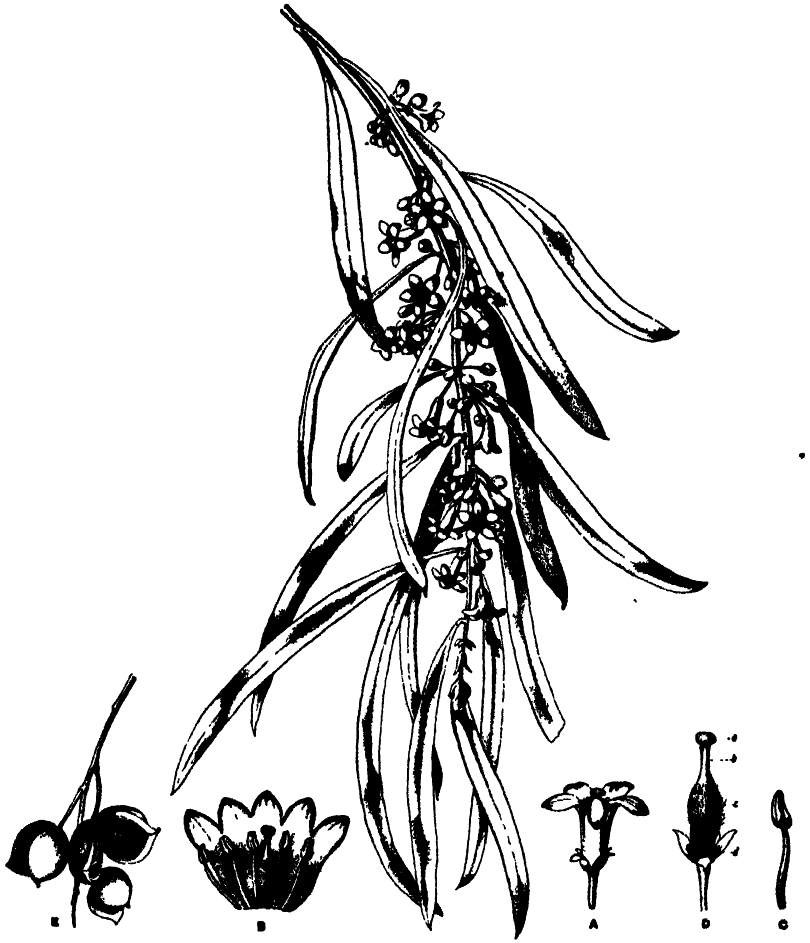
Now, in this talk on useful native plants I am going to confine my remarks to trees, since the time will not permit of dealing with more than a few only of the plants deserving of mention. The preservation of the tree life of the interior of Australia is a matter of vital importance to the pastoral industry, and, indirectly, to each and every one of us. One of the most serious problems we have to face to-day is that tree life is threatened with extinction over large areas of country capable of supporting such growth. Many of the native trees are short-lived plants; but, prior to the advent of the white man, this was amply compensated for in nature by the ease with which most such plants regenerate after rains following periods of drought. The introduction of grazing animals, however, and particularly sheep, and of pests such as the rabbit, has meant that much of this natural regeneration has been and is still being prevented, because the stock are especially fond of the young seedling plants and will not allow them to reach maturity. Thus the losses of adult tree life due to senescence, drought, and other causes, are not being sufficiently made good owing to this interference with natural regeneration.



MULGA AND BROAD-LEAVED MULGA
(*Acacia aneura*, F.v.M., and var. *latifolia*).
(From *Forest Flora of N.S.W.*, J. H. Maiden.)

Another factor making for the destruction of trees is the parasitic Mistletoe, the sticky seeds of which are spread by birds, and which as a consequence infests large numbers of trees, more especially in the vicinity of waterholes and other places where birds congregate. The pulling down of Mistletoe is a practice well worthy of being encouraged, not only because it affords excellent feed for sheep, but also because the practice benefits the trees from which it is removed.

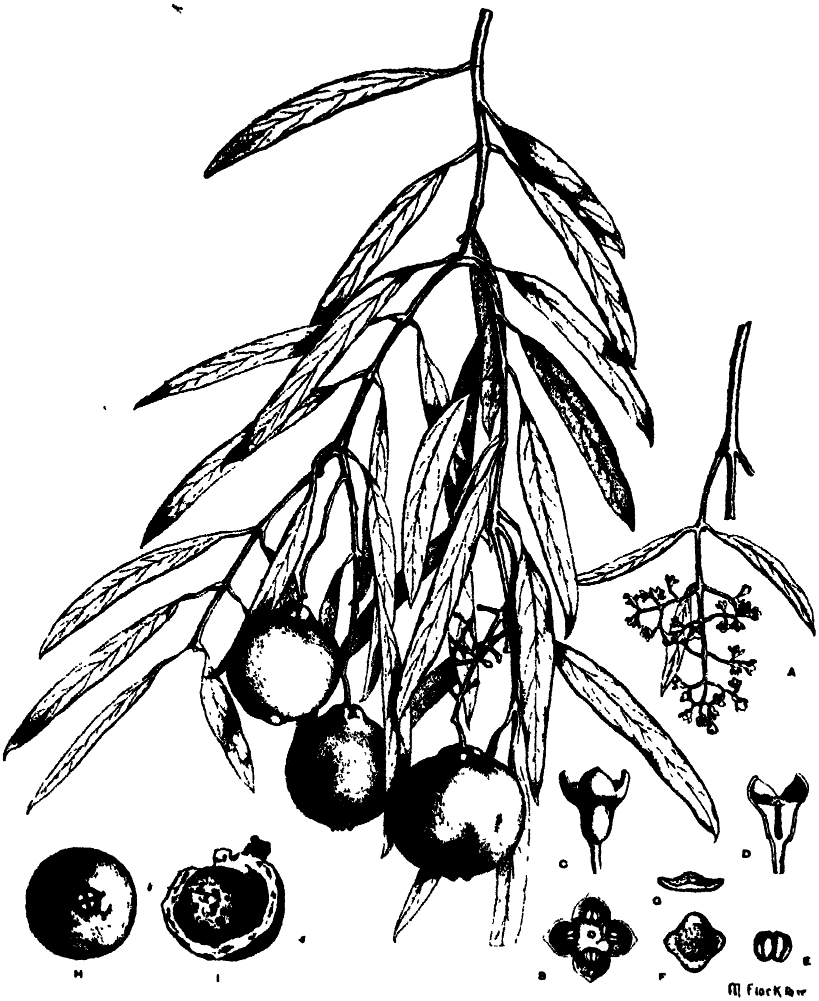
The Mulga is one, only, of many species of dry land *Acacia*, and of the true Mulga, *A. aneura*, a number of growth forms can be recognised; but the name Mulga is also applied to certain other species. Thus we have the Umbrella Mulga, *Acacia brachystachya*, and the Red Mulga or Minaritchee, *Acacia cyperophylla*. The



THE NATIVE WILLOW
(*Pittosporum phillyreoides*, DC.).
(From *Forest Flora of N.S.W.*, J. H. Maiden.)

latter tree, which occurs in the extreme North of the State, is a handsome straight-stemmed tree with conspicuous red, flaky bark, and with very long cylindrical leaves, or phyllodes. Amongst other Acacias we may mention the Myall, *Acacia Sowdenii*, the Broughton Willow, *Acacia salicina* with its drooping habit and pale-yellow flowers, and the Gidgee, *Acacia Cambagei*, with its evil-smelling foliage most noticeable during damp weather, or when moist with dew. Various Acacias of more shrubby habit also occur, such as the Umbrella Bush, *Acacia ligulata*, common on sandhills near the Murray and towards the gulf, and conspicuous on account of its deep golden-yellow flowers; then there is the Prickly or Desert Acacia, *A. Victoriae*, and the Dead Finish, *Acacia tetragonophylla*.

It may be pointed out that many trees of somewhat straggling habit can be much improved, both in appearance and shade value, by judicious lopping and pruning, and that this is most beneficial to the growth and usefulness of the trees. Many trees of fodder value are rendered more effective as shade trees by the sheep themselves, their undersurfaces being often trimmed quite flat owing to the sheep nibbling the branches as high as they can reach.



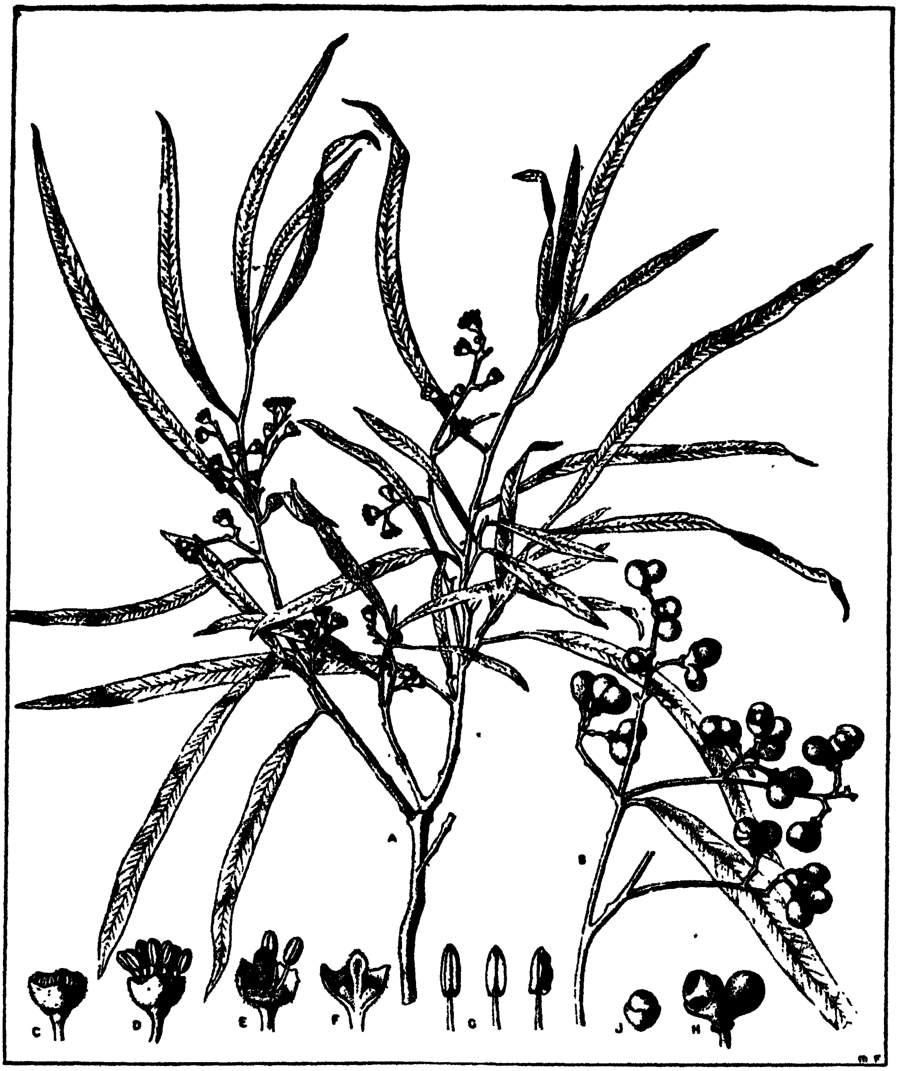
QUANDONG
(*Fusanus acuminatus* R.Br.).
(From *Forest Flora of N S.W.*, J. H. Maiden.)

Of the trees other than Acacias there is a large range, and we may omit, for purposes of the present talk, the Eucalypts, and also the several species of Native Pine, or *Callitris*, in order to deal with some trees that are less familiar though equally deserving of attention. As regards the Oaks, or *Casuarinas*, we may briefly mention the Belar or Black Oak, *Casuarina lepidophloia*, the branchlets of which are of value as feed for stock, and the Bull Oak, *Casuarina Luehmannii*, much inferior to the first as a fodder tree. An important tree, usually found growing on heavy alluvial soils, is the Wilga, *Geijera parviflora*, a member of the Citrus family though with small dry, not succulent, fruits. It grows into a very shapely tree providing

D

excellent shade, and its foliage is much appreciated by stock.

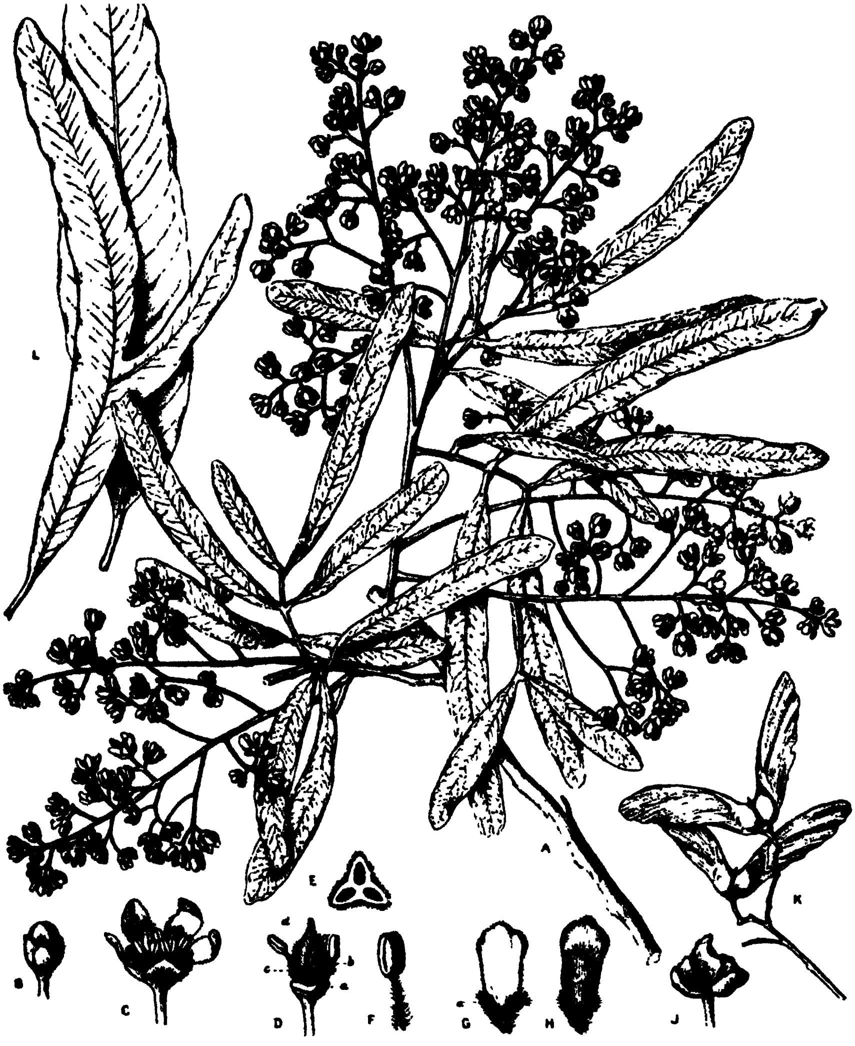
The Native Willow, or Pittosporum, *Pittosporum phillyreoides,* is a tree with slender, drooping foliage, and conspicuous orange-coloured fruits. When ripe the fruits open in two or three valves, exposing the seeds which are sticky and bright red in colour. It is a tree of rather diffuse habit but its foliage is eaten readily by animals.



THE BULLOCK BUSH
(*Heterodendron oleæfolium,* Desf.).
(From *Forest Flora of N.S.W.,* J. H. Maiden.)

Referring again to the Fragrant Sandalwood, this tree belongs to a family of partial parasites related to the Mistletoes, but differing from them in being parasitic upon the roots, only, of other plants. In addition to the Sandalwood, the family includes several plants of importance, such as the Quandong, *Eucarya acuminata,* with its large, red, berry-like fruits, the Bitter Quandong, *Eucarya persicaria,* the Native Cherry, *Exocarpus cupressiformis,* and the

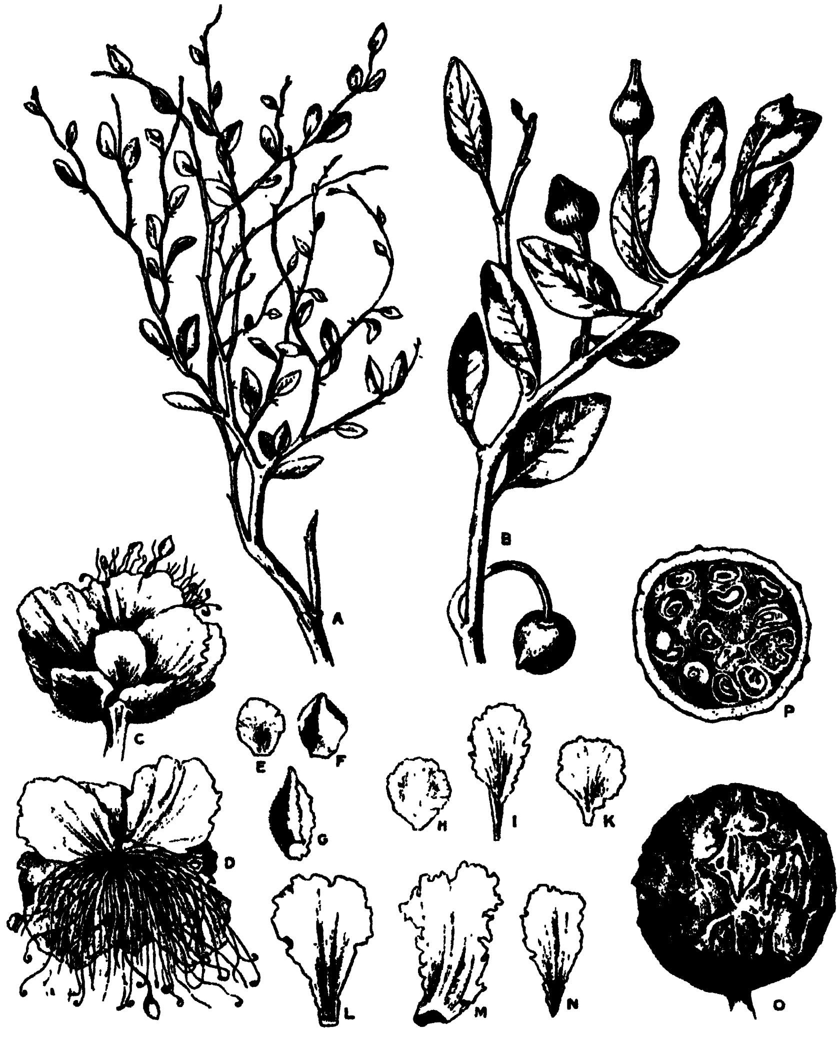
Native Plum, *Santalum lanceolatum*, the last-named with small purple berry-like fruits. All of these plants provide feed for stock during drought periods.



THE WHITEWOOD
(*Atalaya hemiglauca*, F.v.M.).
(From *Forest Flora of N.S.W.*, J. H. Maiden.)

Quite distinct from the Fragrant Sandalwood and its allies is the Fodder Sandalwood, *Myoporum platycarpum*, which belongs to an entirely different botanical group. It is more nearly related to the Native Myrtle, *Myoporum montanum*, and the Boobialla, *Myoporum insulare*. This tree is a valuable standby in times of drought, the branches being cut down and fed to the hungry stock. By a strange coincidence the name "Native Plum," which is usually applied to *Santalum lanceolatum*, a member of the Fragrant Sandalwood group is sometimes given to the Emu Bush, *Eremophila longifolia*, a member of the Fodder Sandalwood family.

A very important tree is the Bullock bush, *Heterodendron oleifolium*, with its olive-like, bluish-green foliage. This tree stands lopping very well and the foliage provides useful feed, though it is sometimes liable to cause poisoning, especially if it is wet with rain or dew. The poisoning effects are due to the liberation of prussic acid and can often be avoided by allowing the loppings to wilt thoroughly before feeding them to stock. Related botanically to the Bullock Bush is the Whitewood, *Atalaya hemiglauca*, which inhabits the extreme North of South Australia, extending into New South Wales, Queensland, and Central and tropical Australia. It has long, pinnately-divided, and strongly-veined leaves of a blue-green colour, dense panicles of flowers, and winged fruits. The foliage of this tree, when eaten in large amounts, is poisonous to horses, though it does not appear to affect other classes of stock. Even in horses, the symptoms of poisoning may take weeks to appear. It

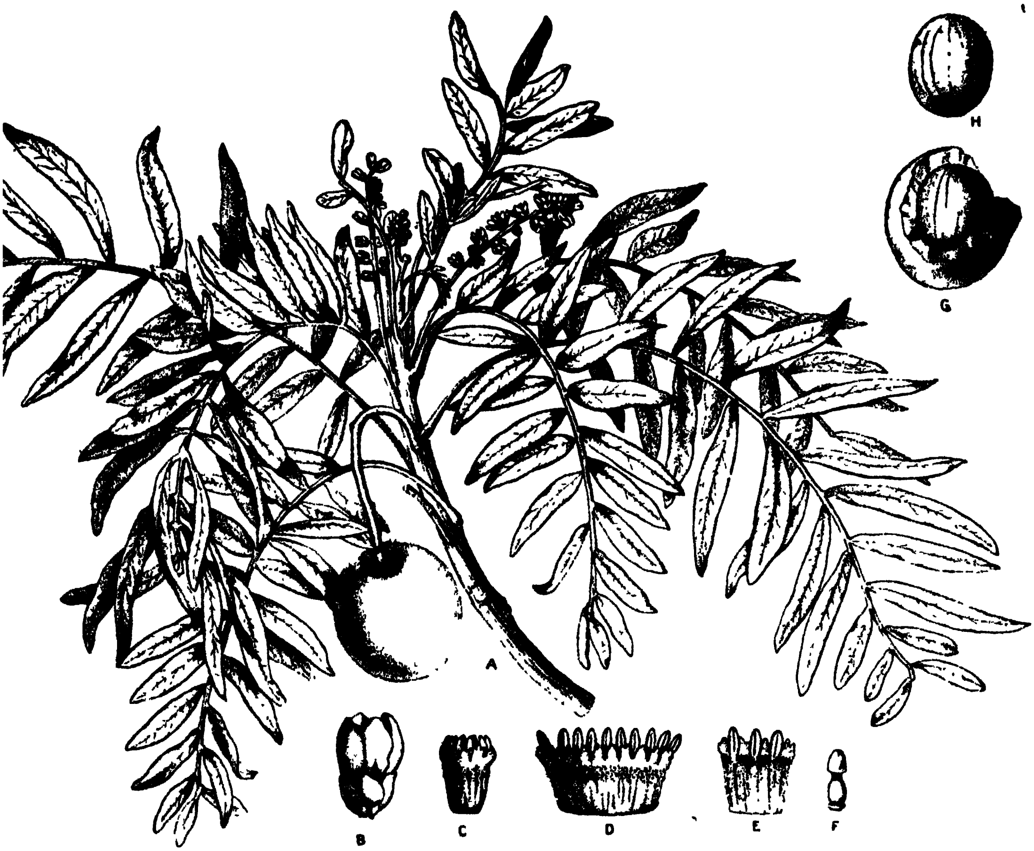


WILD ORANGE
(*Capparis Mitchelli* Lindl.).
(From *Forest Flora of N.S.W.*, J. H. Maiden.)

is the cause of the Walkabout disease of horses in the Kimberly district of Western Australia.

A tree appearing as a thorny shrub when young but forming quite a well shaped tree when full grown is the Native Orange, *Capparis Mitchellii.* It bears large, creamy-white, showy flowers, and stalked, berry-like fruits which smell pleasantly when ripe.

The Native Poplar, *Codonocarpus cotinifolius,* is a handsome but usually slender-growing tree with greyish-green leaves and bell-shaped fruits. Both the foliage and bark are strongly pungent to the taste, and on this account it is often referred to by such names as Mustard Tree and Horseradish Tree.



THE MOLEY APPLE or COLANE
(*Owenia acidula,* F.v.M.).
(From *Forest Flora of N.S.W.,* J. H. Maiden.)

A tree of very ornamental appearance, and one well worthy of being grown, is the Moley Apple or Colane, ***Owenia acidula,*** a tree related to the White Cedar and occurring on sandy rises in the North. The foliage is somewhat like that of the Pepper Tree, and it contains a white milky sap. It bears large red fruits rather like those of the Quandang, and with a similar subacid taste.

Many if not all of these trees are worthy of being grown both for the shade and ornament, especially in the vicinity of the station homesteads. The presence of trees adds greatly to the attractiveness of the landscape, and helps to make conditions of living more tolerable and enjoyable to men and women out back.

The Establishment of a Modern Poultry Plant

[By C. F. ANDERSON, Chief Poultry Adviser.]

One of the most important factors involved in establishing a modern poultry plant is the adaptability of the person concerned to handle poultry.

Many people enter the poultry industry with either an obvious dislike for poultry keeping, or they are not physically adapted for essential work in the care of poultry. Although not necessarily of a laborious nature, the work requires close attention and the almost continual presence of the person concerned, whether it be on a Saturday, Sunday, or holiday. That, however. is an aspect on which the individual must satisfy himself.

Finance.

Commercial poultry farming to-day should be looked upon as a business, the same as any other industry, and must be run on commercial lines. Unfortunately, many people engage in the industry after having been more or less unsuccessful in some other sphere of life and expect to be successful with poultry. This is an entirely wrong view to take. To be successful at poultry farming one must have sufficient capital to finance the plant, living expenses, etc., having in mind that for the first two years at least returns obtained from the stock will go back into the plant to build it up until it is eventually self-supporting. Also, allowance must be made during the first year or two for lower returns generally than would be expected, owing to the inexperience of the individual. Too many people commence this industry under the disadvantage of having practically to wait for one day's eggs to pay for the next day's food. No industry can be expected to be successful under this method of finance.

Having satisfied oneself firstly that he is adapted for keeping poultry, and secondly has the necessary finance available, he then comes to the more serious factors of the establishment of a plant.

The Site.

The first consideration in establishing a plant is the choice of a suitable site. Very emphatically there are too many people of the opinion that the keeping of poultry on a scale sufficient to be self-supporting for a man and his family is a suburban industry. This idea is entirely wrong. Poultry farming is one of our primary industries, and, being so, requires sufficient area for the birds to be comfortably housed, have enough ground for the growing of ample supplies of green feed throughout the whole year, and also sufficient ground for the growing of young stock on free range. In addition, no primary industry can be expected to pay the rates and taxes charged for residential blocks.

In selecting the site one should always keep in mind the fact that in South Australia almost 98 to 99 per cent. of the industry is dependent on the production of eggs, and as eggs are a perishable product, it is essential that one should be in a position to get the product to the marketing centres as quickly as possible; in other words, if you are some distance from the markets you are immediately under a handicap compared with those producers reasonably close.

One should also keep in mind that the site should be fairly well-sheltered. Nothing affects poultry more adversely than exposure to winds. They seem to thrive fairly well in heavy rainfall districts, but when the houses are exposed to bad winds it is difficult to maintain average production.

Soil.

It is my definite opinion that wherever available provision should be made for the birds to have as much run as is conveniently possible. This brings us to the class of soil which is to be preferred. Obviously the hard clay soils are not suitable, for the reason that in the course of a few years they become stale and infected with many parasites which have a serious effect on the health of the stock. The ideal soil appears to be that of a sandy loam, allowing the birds a reasonable amount of scratching, and at the same time permitting water to drain away quickly. This is particularly necessary in heavy rainfall districts.

Water.

There should be a good water supply throughout the whole year, particularly for the irrigation of green feed. It is very doubtful whether there is any part of this State where green feed suitable for poultry can be grown throughout the year without irrigation. The amount of water required, of course, depends largely on the number of birds to be kept, but one could take as a reasonable guide one acre of green feed for every thousand birds, and this area should be under irrigation.

The Area of Land Required.

The area of land depends firstly on the number of birds to be kept, secondly on the nature of the soil. For what can be termed a "one-man plant" it is generally accepted that 1,500 adult birds should be kept to give a reasonable return on the capital outlay, and sufficient to provide a decent living for a man and his family. Assuming that this is the number of birds aimed at, the area of ground required would be from five to six acres, all of which should be useful.

Stocking the Plant.

We now come to one of the most difficult phases of the establishment of a poultry plant, and that is to determine by what method the stocking of the plant is to be done. There are several ways in which this could be commenced, but I would advise the individual not to start on too large a scale. There are so many details to be considered in poultry farming (a setback in any one of which may mean failure for that particular season) that one would be very well advised not to commence on too large a scale for the first year, and I suggest that the aim should be for 500 pullets in the first rearing season. If one is able to accomplish this with a suitable class of stock, he should be well satisfied with his efforts. The methods of stocking are numerous, and I will just mention a few of them.

1. The purchasing of sufficient breeding stock to supply eggs for incubation. This necessitates the erection of breeding yards and obtaining the stock, and where one is aiming at the suggested 500 pullets, this often presents a difficulty in the way of getting sufficient stock of the quality necessary to commence operations. It also necessitates having available 2,100 eggs suitable for incubation. These, of course, would not all be set at once, but would probably be set in three batches—one during July, one in August, and one in September.

For the best results in incubation the eggs should never be older than seven days, so in actual figures it means that in order to get, say, 700 eggs suitable for incubation and not older than one week, an average of 100 eggs a day will be needed. One would be reasonably fortunate if the breeding stock averaged 50 per cent. eggs suitable for incubation; in other words, somewhere in the vicinity of 200 breeding hens would be required. This number could be reduced if the eggs were set every week instead of once in every three weeks, but against that principle one has to consider the fact that instead of having three batches of chicks in the season, he will probably have 10 or 11 batches, and the best results could not be expected under this method.

2. Fertile eggs could be purchased and incubated. This plan means that one has either to establish incubators or else have the eggs hatched.

3. The purchase of day-old chicks and the rearing of same; or

4. The purchase of pullets at from 8 to 10 weeks of age.

In reviewing the four methods mentioned it appears that for the first one or two years of operations the individual has quite enough to do without worrying about the question of breeding stock or incubation. This brings us to suggestions 3 and 4, and I believe that the most economical way to commence stocking is to purchase the chicks at a day old and rear them on the place.

In whatever manner stocking is commenced there is always an element of risk, and the fact cannot be overlooked that at some time or other the individual has to master the rearing of his stock.

With regard to the fourth suggestion, that is, the purchase of pullets at from 8 to 10 weeks old, it is very doubtful whether this is an economical proposition from a commercial egg-producing point of view.

One should first consider the initial cost of the pullets, then the cost of feeding them for the first 12 months, added to which is the loss of a percentage of the birds. This must all be taken into account when considering the returns that are to be obtained from the production of eggs for the 12 months. If the question is looked at from this angle, it will be found that there will be very little return above cost of feeding for at least the first season.

The Lay-out of the Plant.

The lay-out of the plant should also be considered closely, because one should keep in mind that with the keeping of poultry it is essential that the labour should be kept down to the very minimum, and the amount of necessary labour depends largely on the lay-out of the plant. The plant should be systematically set out, firstly for ease of working, which necessitates proximity to the feeding shed. This should always be in a central position on the farm. Automatic water supplies should be available, and the houses so constructed that they are easily cleaned out and re-strawed from time to time.

Housing Units.

I would particularly advise the beginner, although one must always be commercial in the matter of housing poultry, not to attempt to overcrowd his stock or to run the birds in too big numbers. It is suggested that 100 birds should be the maximum number of laying stock in a unit.

The Egg Room.

There is a great necessity for the provision of a suitable egg room. After all, the results from the plant depend on the returns obtained, principally from the sale of eggs, and as the majority of poultry breeders in this State experience fairly hot summers combined with the fact that the egg is a most perishable product, a suitable storage room for the eggs should be considered of utmost importance, and generally an underground room enables the eggs to be held at a reasonably low temperature.

The principles of the establishment of a poultry plant have been given within the limits of this talk, and there are many details to be considered. Intending poultry keepers are advised to follow as far as possible the accepted principles in poultry keeping rather than to try out some new scheme in the early part of the establishment of the plant. After all, those coming into the industry now have defintie advantages over the pioneers of this particular industry. The methods of housing, incubation, rearing, and particularly marketing, have made very rapid headway in the last few years, and those interested are recommended not to depart radically from proved ideas.

Botulism in Farm Animals

[By C. T. McKenna, B.V.Sc., M.R.C.V.S. (Veterinary Officer, Stock and Brands Department).]

In South Australia, Botulism is frequently observed in dairy cows and farm horses; sheep are only rarely affected, whilst the condition has not been reported in pigs.

Botulism is due to a poison, known as a toxin, which is manufactured by a germ, the *Bacillus botulinus*. This bacillus is common in cultivated soils, but it is, not itself, dangerous to stock. It is only when the Botulinus germ finds a suitable material on which to grow that it can produce its toxin, and this poison must be taken into the digestive canal of the farm animal before the disease can occur.

Some common and suitable mediums on which it can multiply are:—

1. The carcases of animals such as farm stock, rabbits, rats and mice, which are to be found around the farm.
2. Certain fodders such as cereal hay (in stacks), ensilage, and also heaps of cocky chaff and old straw stacks which have been damaged by rain.

It is evident that there are ample opportunities, *e.g.*, in dust raised from the surface soil, for this germ to contaminate such material. However, in spite of this, the number of outbreaks of Botulism amongst our farm animals is not unduly high, because the bacillus does not grow readily.

It requires a moist environment, warmth, and an absence of oxygen (air) before it will start to multiply. As it cannot itself provide surroundings which are free from oxygen, it often grows in the company of other germs and moulds which have this power and which also require moisture and warmth for their growth.

In practice, we find that those outbreaks of Botulism which result from feeding on infected fodder are more common after a mouse plague and also follow those seasons which are favourable to mould growth on the hay.

The explanation is that firstly mice frequently invade haystacks and the bodies of dead ones and even the nests of the live mice in such stacks make suitable breeding places for the *Bacillus botulinus.*

Secondly, such damaged fodders as mouldy hay, grain, straw, and ensilage, and also heaps of damp musty cocky chaff, provide favourable surroundings in which this germ can grow. However, Botulism can follow the ingestion of fodder which does not appear in any way unwholesome and the feeding of mouldy forage does not necessarily cause this disease.

The toxin of the Botulinus bacillus must be present in the food before the disease can occur in stock fed on it.

Many farmers believe that Botulism is contagious. This is not so. A number of animals is usually affected in an outbreak and this is due to the fact that they have all been eating the same poisonous feed.

The whole of a haystack is not infected; there may be only a pocket which contains the toxin, but it is so powerful that only a very small amount is necessary to set up the disease.

Again this condition differs from an ordinary poisoning in that signs of illness do not occur until about from 3 to 7 days after the animal ate the foodstuff containing the toxin. It is this fact which makes it so difficult to get samples of infected fodder for examination.

Now the manner in which the Botulinus toxin enters the digestive canal of cattle is usually quite different from the way in which it is taken into the food tract of the horse.

We will first deal with its method of entry into cattle.

Botulism in cattle, or Dry Bible as it is misnamed, is usually confined to dairy cattle and generally to good types of dairy cows. Scrub dairy cattle and beef cattle are rarely affected.

The history of outbreaks in dairy herds is that invariably the affected animals were bone chewers and that in many cases they even ate the decomposing flesh of dead animals. The biggest milkers are usually the first ones to develop the disease and the great majority of outbreaks of Botulism occur during the dry periods of the year, *i.e.*, when there is a shortage of those food constituents—protein and mineral matter—which are essential for milk production.

It is this shortage of protein and mineral matter in the cow's diet which is the cause of her bone chewing and the eating of decaying animal matter. These substances are rich in these food constituents. Should the bones or carcase on which the dairy herd are accustomed to feast contain the toxin of the *Bacillus botulinus*, then it is only a question of time before Botulism breaks out in that herd.

The best milkers develop the disease first because their appetite for protein and mineral matter is greater than the lower producers and dry cows.

Botulism in the horse, on the other hand, invariably occurs through the ingestion of food—generally chaff—containing the toxin. For this reason, it is popularly known as "Forage Poisoning."

In certain seasons, severe outbreaks of the disease occur amongst farm teams and the mortalities can be high. The majority of cases take place during the summer months.

Cattle and sheep, on occasions, contract Botulism in the same manner as horses do, *i.e.*, by the ingestion of infected fodder. Mouldy ensilage is very likely to contain the toxin of this disease.

Symptoms.

Symptoms are similar in all affected farm animals.

In an outbreak of Botulism, the history very often is that a number of the animals are sick, but rarely 100 per cent. The cases occur over a period of about from 1 to 2 weeks. Usually the first symptom to be observed is that the animal loses control of its limbs. The gait is erratic, sluggish, and uncertain, and there is a swaying of the hind-quarters during movement. This increases in intensity and the animal generally goes down. It can only rise with difficulty or not at all.

The cow usually lies quietly, but the horse on the other hand may show violent paddling movements of the legs. In severe cases, the patient is very dull and listless, there may be profuse sweating and the appetite is in abeyance. Death usually occurs in from 24 to 48 hours.

In other cases, the first symptom may be a difficulty in swallowing. The animal may attempt to eat or drink, but can only do so with difficulty or not at all. This inability to swallow normally is due to paralysis of the muscles of the tongue and throat, and is a most characteristic symptom of the disease. It is usually accompanied by the dripping of saliva from the mouth and the protrusion of the tongue. It is not present in all cases of Botulism. In less acute cases, the affected animal may linger on from 72 hours to a week or more, or even up to three months. The mortalities from Botulism are high, but a certain percentage of the animals may recover.

The most marked features of this disease are paralysis of the muscles of locomotion, and often of those muscles associated with swallowing, the great prostration and the general and progressive weakness.

Treatment.

Treatment is not satisfactory and in those cases where there is difficulty in swallowing the administration of drenches, which is the usual method of giving medicines to cattle and horses, is dangerous.

The drench may find its way into the lungs and cause a fatal pneumonia.

In the case of the horse, the first thing to do if he is down is to sling him. The sling should be adjusted so that it is well under the brisket. A breeching and breast strap is also required. The cow should not be put in a sling, but should be made comfortable.

Before attempting to give a medicinal drench, it should be ascertained by offering the patient a drink of water whether it can swallow or not.

The following medicines (for a horse or cow) could be tried:—

(1) In the early stages of the disease, and as soon as symptoms are observed, give a small teaspoonful of Condy's Crystals, dissolved in a quart of warm water.

(2) Later give a drench of raw linseed oil 1 pint, oil of turpentine 2ozs.

(3) Subsequently give a heaped teaspoonful of powdered nux vomica mixed with treacle each night and morning.

(4) The giving of alcohol is of benefit, and from 6ozs. to 10ozs. of whisky in water should be given at suitable intervals.

All the animals should be taken off the suspected feed and the sick ones should be given what feed they will eat. The giving of a large variety of drugs is not advisable.

Prevention.

In the case of cattle, the prevention of Botulism is easily accomplished by:—

(1) Providing foods rich in protein and mineral matter during the dry months of the year. Such foods are oats, linseed meal, and other concentrates, and also lucerne and ensilage. Further, the cereal hay should be cut on the green side. Where there is a shortage of the usual concentrates, meat meal at the rate of ½lb. to 1lb. daily should be fed. It is difficult to get cows to start eating it, but by starting off with small amounts, they will get used to it.

(2) The giving of minerals.—It is suggested that the milkers be given sterilized sweet bone flour or dicalcic phosphate (concentrated). The amount would depend on the milk supply and the feeding, but on an average 3oz. to 4ozs. of the former and 2oz. to 3ozs. of the latter should be given in the feed daily.

A mixture of 60 per cent. salt and 40 per cent. sterilized sweet bone flour (or 30 per cent. dicalcic phosphate concentrated), damped with molasses solution, should be made available as a lick for the rest of the cattle.

(3) By preventing the cattle from having access to bones and the carcases of animals.

Unfortunately, in the case of the horse, where the disease is brought about by the eating of poisoned fodder, no very satisfactory methods of preventing Botulism are available.

The following recommendations are, however, suggested:—

(1) Only the best of fodder should be fed to horses. Mouldy hay (chaff) should not be fed to them for two reasons:—

(*a*) It can cause severe digestive disturbances; and

(*b*) It may, but does not necessarily so, contain the Botulinus toxin.

(2) If mouldy foodstuffs have to be fed to horses, only the less-damaged samples should be selected, and they should before being used be exposed to strong sunlight in dry weather until the mouldy smell disappears. This should take about two days. Affected sheaves of hay should be opened up before treatment.

(3) Conditions which may favour the growth of this germ and also mould should be avoided, *e.g.*, sheaves of hay should be dry before they are put in a stack; if rain threatens during the building of the stack, it should be covered, &c.

(4) The building of mouse-proof stacks is of definite value in preventing Botulism.

Tatiara Fallow Competition

Organized by a committee appointed from the Tatiara, Wolseley and Mundalla Branches of the Agricultural Bureau, the Tatiara Fallow Competition this year was judged by Mr. E. S. Alcock (District Agricultural Instructor), who said that the fields submitted for his inspection were of a high standard, the season having been very favourable for soil working.

The following Table sets out the Scale of Points and the awards made by Mr. Alcock.

Name and Address of Competitor.	Position.	Compactness of Under-Layers. 25	Condition of the Seedbed. 15	Condition of the Mulch. 15	Suitability of Depth. 20	Freedom from Weeds. 25	Total. 100
A. E. J. Grosser, Wolseley	1	24½	14½	14½	19	25	97½
H. C. M. Pilgrim, Wolseley	2	24½	14	14½	19	25	97
J. E. K. Ridway, Wolseley	3	24	14½	14	19	25	96½
R. A. Grosser, Wolseley	4	24	14	14½	19	24½	96
Fisher Bros., Bordertown	4	24½	14½	14	18½	24½	96
E. J. Buckley, Bordertown	4	24½	14	14½	19	24	96
H. C. M. Pilgrim, Wolseley	7	23½	14	14½	19	24½	95½
C. England, Bordertown	8	24	14	14	19	24	95
H. S. Hinge, Mundalla	8	23½	14	13½	19	25	95
E. W. Sharrad, Wolseley (1)	10	23	14	14½	18	24	93½
D. R. Milne, Bordertown	11	22½	13½	13½	19	23½	92
E. W. Sharrad, Wolseley (2)	12	22½	13½	14½	17½	23	91
C. Call, Wolseley,	13	22	13	14	18	23	90
L. H. Butler, Bordertown	14	21	13½	14	18	23	89½
E. Etherton, Wolselye	15	21	12½	13½	17½	24½	89
S. A. Snoad, Wolseley	16	21	12½	13½	18	22	87
J. D. Mayes, Wolseley	withdrawn						

Final Results of Cereals and Hay, 1937-38

[By A. W. Bowden, Government Statist.]

Wheat.—1938-38: Acres 3,161,194, Yield 43,403,263bush., Average 13.73bush.

Wheat.—1936-37: Acres 3,058,457, Yield 28,714,653bush., Average 9.39bush.

1. Acreage Cropped.

Divisions.	Total Wheat. Barley, Oats.	Grain.			Hay (W.B.O.).	Fed off Areas (W.B.O.)
		Wheat.	Barley.	Oats.		
	Acres.	Acres.	Acres.	Acres.	Acres.	Acres.
Central	997,643	530,024	249,353	36,623	160,778	20,865
Lower North	1,021,021	774,769	79,927	29,608	113,829	22,888
Upper North	330,680	301,065	1,179	3,327	24,229	880
South-Eastern	101,909	41,676	12,403	20,376	24,763	2,691
Western	1,140,822	824,181	26,433	161,458	102,019	26,731
Murray Mallee	954,644	689,479	36,735	80,870	117,739	29,821
Total, 1937-38	4,546,719	3,161,194	406,030	332,262	543,357	103,876
Total, 1936-37	4,412,088	3,058,457	304,559	414,723	525,445	108,904
Increase or decrease	134,631	102,737	101,471	−82,461	17,912	−5,028

2. Production of Grain and Hay.

Divisions.	Grain.						Hay (W.B.O.)
	Wheat.		Barley.		Oats.		
	Bush.	Av.	Bush.	Av.	Bush.	Av.	Tons.
Central	8,765,768	16·54	5,506,473	22·08	495,660	13·53	235,768
Lower North	14,235,492	18·37	1,737,680	21·74	527,915	17·83	176,869
Upper North	3,922,305	13·03	22,925	19·44	56,835	17·08	32,747
South-Eastern	855,301	20·52	243,596	19·64	391,529	19·22	31,964
Western	7,713,084	9·36	443,974	16·80	987,474	6·12	77,650
Murray Mallee	7,911,313	11·47	446,877	12·16	535,437	6·62	101,295
Total, 1937-38.	43,403,263	13·73	8,401,525	20·69	2,994,850	9·01	656,293
Total, 1936-37.	28,714,653	9·39	4,260,462	13·99	2,363,806	5·70	478,435
Increase or decrease	14,688,610	4·34	4,141,063	6·70	631,044	3·31	177,858

3. Five Years' Comparison.

Year.	Wheat.			Rainfall Agric. April-Nov.	Value of Oversea Exports.	
	Area.	Yield.	Average Per Acre.		Wheat and Flour.	Barley.
	Acres.	Bush.	Bush.	Inches.	£	£
1932-33	4,066,782	42,429,614	10·43	14·70	5,225,173	319,877
1933-34	3,821,795	35,373,466	9·26	12·15	2,731,285	294,071
1934-35	3,188,225	27,455,600	8·61	11·97	4,139,633	345,550
1935-36	2,989,490	31,615,744	10·58	12·08	4,510,137	352,265
1936-37	3,058,457	28,714,653	9·39	10·00	4,944,881	432,079
Mean	3,424,950	33,117,815	9·65	12·21	4,310,222	348,768
1937-38	3,161,194	43,403,263	13·73	11·78	5,310,904a	696,761a

(a) Ten Months.

Nelshaby Agricultural Bureau Annual Seed Wheat Competition, 1938

[Judged by E. L. ORCHARD, District Agricultural Adviser.]

Conducted in the same efficient manner of former years, this Competition, which has for its objective the maintaining of a high standard of quality in the seed wheat sown throughout the district, again demonstrates its usefulness through the excellence of some of the samples submitted for judging in the 1938 Competition.

It was also pleasing to find an increase in the total of exhibits, which may be taken as an indication of the importance assigned by district farmers to the necessity for sowing seed of known quality only as one of the essential factors ensuring the highest returns from the crop to follow. In matters of this kind, therefore, credit is due to the Branch for the manner in which interest has been guided and built up along the lines of proven practice toward the elusive goal of perfection—an aim which, in this instance, must ultimately bring its own reward to the individual farmer in the shape of fuller returns of a better class product; and even if there be some truth in the oft-repeated assertion that our methods of wheat marketing at the moment offer no encouragement to the careful grower, the sudden and oft revolutionary march of events may see changes inaugurated at comparatively short notice, for which it is surely the profitable business of every farmer to be prepared.

In most localities of the Upper North weather conditions during the later harvest days of 1937 did not enhance the prospect of reaping bright grains from mid-season wheats, and consequently earlier varieties, which had the advantage of being harvested prior to the unusually heavy summer rains, retained their grain gloss to a much greater degree. Bleaching, however, was not so pronounced in the district under review, although, from a competitive viewpoint, its effect was apparent with some of the entries.

In accordance with the conditions set out for its management, the Competition was constituted of two classes, that of a collection of two kinds, and the second for the champion variety of wheat chosen from the whole of the individual entries tabled, the representative samples being procured in 2lb. lots by drawing from 5-bag reservations in the barns of the exhibitors.

The exhibits numbered 6A (Quality) and 6B (Sultan), made by Mr. A. V. Bain, with a total of 191.50 points, were successful in Class I., whilst the entry of Sultan by the same owner carries off the title of champion variety, with an allocation of 96 points. The uniformly high standard of the two wheats is at once evident, Quality scoring to within half a point of Sultan.

Weight per Bushel: 25 *Points.*—Varying from 65¼lbs. down to 57lbs., the bushel weight would seem to provide an index as to the reapings before and after the wet weather, the contrast being strengthened by a comparison of the samples of Nabawa, where 64¼lbs. was pulled, against 58½lbs. Ranee 4H weighed as well as usual, tipping the beam at 65lbs., whilst the average of the whole of the entries ran out at practically 61¾lbs.

Plumpness and Evenness of Grains: 15 *Points.*—The Ranee 4H and Sultan, whilst constituting examples of the shotty type of kernel, alongside the fuller, plumper grain, were extremely good samples of their classes, the more elongated Nabawa tending to betray any bleaching very readily.

Freedom from Visible Admixture: 15 *Points.*—No great amount of fault could be found in this direction, its detection being rendered somewhat more difficult by the rather uneven ripening and consequent blotchy colouring at times.

Freedom from Bunt, Weed Seeds, Etc.: 20 *Points.*—Bunt had unfortunately intruded in one sample, and barley was rather prominent in two others, Sheep Weed and Charlock providing a little further infestation.

***Freedom from Injury in Harvesting*: 15 *Points*.**—Cracked and broken grains were noted on several occasions, an exhibit of Sword displaying rather the greatest degree of damage in this respect.

***Freedom from Dirt, Chaff, Straw, Etc.*: 10 *Points*.**—Weevil had made a start on one sample, and chaff had persisted to a greater extent in one or two others, a little dust showing up in one exhibit only.

Results of Nelshaby Seed Wheat Competition, 1938.

No.	Name.	Variety.	Weight per Bushel.	Plumpness and Evenness of Grains.	Freedom from Visible Admixture.	Freedom from Bunt, Weed, Seeds, etc.	Freedom from Injury in Harvesting.	Freedom from Dirt, Chaff, Straw, etc.	Total Class 2.	Total Class 1.
		Max.—	25	15	15	20	15	10	100	200
1A	F. Jose	Sword ..	22·50	14	14	20	13	8	91·50	176·25
1B	F. Jose	Ranee ..	19·75	13	13	19	14	6	84·75	
2A	J. H. Franks ..	Nabawa	18·00	13·5	14	20	12·5	6	84·00	—
3A	R. P. Noble ...	Nabawa	22	13·5	13	20	13	10	91·50	186·5
3B	R. P. Noble ...	Ranee 4H	24·5	14	14	20	12·5	10	95·00	
4A	T. Davies	Nabawa	23·75	13	13	17	13	7	86·75	—
5A	L. C. Roberts .	Sword ..	21·75	13	13	17	11	7	82·75	164·5
5B	L. C. Roberts .	Ranee ..	20·25	12	13	18·5	12	6	81·75	
6A	A. V. Bain	Quality	25·00	13	14	20	14	9·5	95·5	191·5
6B	A. V. Bain	Sultan .	23·00	14	14	20	15	10	96·0	
7A	H. Franks.....	Nabawa	17·75	13	13	19	13	6	81·75	159·75
7B	H. Franks	Gluyas..	16·5	12	14	17	12·5	6	78·00	

Blyth Seed Wheat Competition

[Judged by F. Coleman, Member Advisory Board of Agriculture.]

The first Blyth Seed Wheat Competition was judged on the 18th April, 1924. Seven competitors entered in Class 1, "Best collection of three varieties of seed wheat." Samples were taken from not less than five bags of seed as cleaned by the farmer and ready for pickling and sowing that season. The samples were taken by two members of the committee, placed in bags and sealed at the wheat stack at the time of collection. These samples were then submitted to a judge at the one time, and were judged to a scale of points:—Weight per bushel, 25 points; plumpness, 15; freedom from weeds, 20; from admixture, 15; from injury in harvesting, 15; from dirt, chaff, straw, &c., 10; total 100.

The varieties shown were Dart's Imperial, Joffre, Huff's Imperial, Daphne, Felix, King's Head, Major, Currawa, Florence, Federation, and Smut Proof. The winning sample was staged by Mr. E. A. Jericho. It was Huff's Imperial, a beautiful wheat that weighed 69¼lbs. to the bushel and scored 85.75 points. There were some "white heads" in it and chaff, &c. The mean of the 21 samples staged in Class I was 78.27 points

On the 8th April the 1938 Blyth Seed Wheat Competition was judged. Owing to the present day practice of pickling at the time of grading and recleaning the seed wheat, the weight per bushel has been omitted, other points as to plumpness and freedom from weeds, &c., being retained, with the necessary adjustment of points to total the 100. There were 17 entries of two samples each, 34 exhibits. The varieties staged were Dundee (10), Ford (6), Sword (5), Bencubbin and Ranee (3 each), Baringa (2), and 1 each of King's White, Bobbin, Aussie, Ghurka, and Merridin. It will be noted that not one of the 11 varieties shown in 1924 was sown this season.

A note made in 1924 states that "a great majority, over 80 per cent., of the samples had bunt in them, 15 samples had barley grains, and Drake was almost equally evident. Bunt was the worst failing, those with only two or three balls smelt strongly of Bunt."

Commenting on the entries for 1938, Mr. Coleman said:—"The samples staged were free from weed seeds, only one or two balls of Bunt were noted, and a very few samples had a grain or so of barley. The total absence of Poppy, Sheepweed, Charlock, Soapwort, Wild Oats, or other common weeds in practically all the samples was remarkable, and a wonderful contrast to that of 14 years ago. The mean of 92.76 points for the 17 entries in 1938 compared with a mean of 78.27 in 1924 speaks for itself and indicates the great improvement that has taken place in seed wheat production in the Blyth district. To produce such clean seed the crops must have been relatively clean and care taken in selecting clean seed. This undoubtedly will greatly help in cleaner crops, heavier returns per acre, and a better price when sold as seed to other farmers. These Competitions, together with the Crop Competitions, have undoubtedly helped the wheatgrowing industry in South Australia and are worthy of adoption by other wheatgrowing districts in the State.

Competitor.	Variety. Maxima—	Plumpness and Evenness of Grains.	Freedom from Weed Seeds.	Freedom from Visible Admixture.	Freedom from Injury in Harvesting or Preparation.	Freedom from Dirt, Chaff, &c.	Total.
Zweck, H. E.	Dundee	24	25	14½	25	9½	98 } 193
	Ford	24½	23	13½	24	10	95
Eime, W. O.	King's White	23½	25	14½	24½	10	97½ } 193
	Baringa	22	25	14	24½	10	95½
Fuller, M. H.	Dundee	24	25	14½	23½	9½	96½ } 192
	Ford	23½	25	13½	23½	10	95½
Eime, W. O.	Sword	24	24½	14½	24	9½	96½ } 191
	Bencubbin	23½	22	14½	24½	10	94½
Schulze, A. B.	Baringa	*—	*—	*—	*—	*—	96 } 191
	Sword	*—	*—	*—	*—	*—	95
Zweck, H. E.	Ford	22½	25	14½	23½	10	95½ } 190½
	Dundee	23	25	14	23	10	95
Roberts, R.	Ranee	23	24½	14½	24	9½	95½ } 190½
	Dundee	23	24	14½	24	9½	95
McEwin, A. L. & R. R.	Dundee	23	24	14½	24½	9½	95½ } 186½
	Ford	22	23	14	23½	8½	91
McEwin, J. S.	Ranee 4H	22	24	14½	23½	9½	93½ } 186
	Sword	23	23	14	23	9½	92½
Zwecke, H. W.	Sword	23½	25	14	21½	9½	93½ } 185
	Bencubbin	22	25	14	21	9½	91½
Mugge, L. C. & R. H.	Merridin	23½	21	14	24½	9½	92½ } 184
	Ford	23	24	12	23	9½	91½
Neumann, H. W.	Dundee	23	25	14	23	8½	93½ } 181
	Bobin	22	21	13½	22	9	87½
McEwin, J. S.	Ranee	21	25	14½	23	9½	93 } 180
	Dundee	21	20	14	23	9	87
Hutton, C. F.	Sword	22	24	14	21	9	90 } 180
	Ghurka	22	25	14	20	9	90
Zweck, F. W.	Dundee	22	24	14	21	9½	90½ } 178
	Bencubbin	21½	22	14	20	10	87½
Mugge, L. C. & R. H.	Ford	22	24	11	23	9	89 } 176½
	Sword	22	19	14	23	9½	87½
Toysden, D.	Dundee	22	25	15	24½	9	95½ } 176
	Aussie	22	12	14	23½	9	80½

* Details not available.

The Competition was conducted by the following committee of management:—Messrs. A. B. Schulze (chairman), A. L. McEwin, J. A. Pratt, J. S. McEwin, W. O. Eime, H. A. Zweck, H. W. Eime, L. C. Mugge, and K. Zweck (hon. secretary).

Agricultural Shows

We have been advised by Secretaries of Agricultural Show Societies that their Shows will be held on the following dates:—

Crystal Brook	Wednesday, 31st August
Saddleworth	Saturday, 3rd September
Snowtown	Wednesday, 7th September
Adelaide Royal Show	**Saturday, 10th to 17th September**
Gawler	Thursday, 22nd September
Cowell	Saturday, 24th September
Waikerie	Saturday, 24th September
Tailem Bend	Saturday, 24th September
Eudunda	Wednesday, 28th September
Denial Bay	Friday, 30th September
Kadina	Saturday, 1st October
Kapunda	Saturday, 1st October
Naracoorte	Wednesday, 5th October
Streaky Bay	Wednesday, 5th October
Karoonda	Wednesday, 5th October
Renmark	Thursday, 6th October
Murray Bridge	Thursday, 6th October
Great Flinders (Lipson)	Saturday, 8th October
Blyth	Saturday, 8th October
Colton	Saturday 8th October
Moonta	Saturday, 8th October
Two Wells	Saturday, 8th October
Penola	Wednesday, 12th October
Loxton	Wednesday, 12th October
Strathalbyn	Wednesday, 12th October
Yallunda Flat	Wednesday, 12th October
Yorketown	Wednesday, 12th October
Jamestown	Wednesday, 12th October
Tarlee	Wednesday, 12th October
Paruna	Saturday, 15th October
Pinnaroo	Wednesday, 19th October
Maitland	Wednesday, 19th October
Mount Gambier	Wednesday and Thursday, 19th and 20th October
Willunga	Thursday, 20th October
Clare	Saturday, 22nd October
Port Elliot	Saturday, 22nd October
Bordertown (Tatiara)	Wednesday and Thursday, 26th and 27th October
Minlaton (Diamond Jubilee)	Wednesday, 26th October
Burra	Saturday, 29th October
Mount Barker	Thursday, 3rd November
Yankalilla	Saturday, 5th November
Woodside	Saturday, 12th November

The Northern Yorke Peninsula Field Trial and Show will be held on Wednesday, 24th August.

Production of Butter and Cheese.

The production of butter and cheese for April, 1938, was:—Butter, 962,984lbs.; cheese, 778,694lbs.

Feeding Tests at Parafield Poultry Station.

A new series of feeding tests was commenced at Parafield Poultry Station on the 1st April, 1937. Five tests have been arranged each of 50 White Leghorn pullets. The principal object of these tests is to collect some accurate data concerning the results obtained from the soaked grain method of feeding in different ways, also the production of the birds under the various methods of feeding. The following is a list of the tests that have been arranged:—

A. Morning—Soaked wheat at rate of 8lbs. grain per 100 birds, meat meal ½lb. per 100 birds, greenfeed same quantity as dry grain. Afternoon—Same as morning, but meat meal ¼lb. per 100 birds.

B. Morning—Soaked wheat at rate of 8lbs. per 100 birds, ¼lb. meat meal per 100 birds, ¼lb. linseed meal per 100 birds,

greenfeed same as No. 1 test. Afternoon—Same as morning, but without the ¼lb. linseed meal.

C. Morning—Soaked wheat once a day at rate of 8lbs. per 100 birds, meat meal ¾lb. per 100 birds. Afternoon—Dry wheat at rate of 1¼ozs. per bird.

D. Morning—Soaked barley twice a day at rate of 8lbs. per 100 birds, greenfeed same quantity as dry grain, meat meal ¼lb. per 100 birds. Afternoon—Greenfeed same quantity as dry grain, meat meal ¼lb. per 100 birds.

E. Morning—Soaked wheat and barley at rate of 4lbs. wheat and 4lbs. barley per 100 birds, greenfeed same bulk as dry grain, meat meal ½lb. per 100 birds, linseed meal ¼lb. per 100 birds. Afternoon—Dry grain at rate of ¾oz. wheat per bird and ¾oz. barley per bird.

The quantity of food as stated in the test will vary from time to time according to the requirements of the birds. The quantities stated in the tests are given as a basis, but are also liable to alteration according to the requirements of the stock.

Test.	No. Eggs Laid from 1st April, 1937, to 30th April, 1938.	No. Eggs Laid, May, 1938.	Total Eggs Laid from 1st April, 1937, to 31st May, 1938.
A	7,231	337	7,568
B	7,447	335	7,782
C	7,235	273	7,508
D	6,666	121	6,787
E	6,993	210	7,203

	Value of Eggs.		Cost of Food.			
	1st April, 1937, to 30th April, 1938.	May, 1938.	1st April, 1937, to 30th April, 1938.	May, 1938.	Return Above Cost of Food, May, 1938.	Return Above Cost of Food, 1st April, 1937, to 31st May, 1938.
	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.
A	34 13 6	2 8 10	13 11 0	0 19 0	1 19 0	22 12 4
B	35 7 0	2 8 7	13 8 1	0 19 0	1 9 7	23 8 6
C	34 13 0	1 19 7	13 10 1	0 19 0	1 0 7	22 3 6
D	30 19 9	0 17 6	14 15 2	1 1 11	0 4 5 (under)	16 0 2
E	32 18 5	1 10 5	14 2 1	1 0 5	0 10 0	19 6 4

Tubercle Free Herd Scheme.

The following herds have been tested and comply with the conditions laid down by the Tubercle-Free Scheme, whereby stud-owners may apply to have their herds tested, free of charge, by the Stock and Brands Department:—

Owner and Address.	Cattle. No. of	Date. Expiry
1. J. H. Dawkins, Para Wirra Jersey Stud	25	16/4/38
2. W. Hawker, Anama Friesian Stud, Central Bungaree, *via* Brinkworth	37	25/11/39
3. O. H. Woodward, Marama Jersey Stud, Gilles Plains	22	2/11/38
4. G. L. Hampton, Cloverdale Illawarra Shorthorn Stud, Echunga	25	12/8/39
5. J. M. Bray, Sweethaven Jersey Stud, Langhorne's Creek	26	19/8/39
6. Kybybolite Experimental Farm, Kybybolite	88	1/9/39
7. A. Kelly, Alexandra Jersey Stud, Milang	38	21/10/39
8. Agricultural College, Roseworthy	70	9/11/39
9. E. F. Schulz, Eden Valley	30	16/12/39
10. M. A. Clark, Echunga	6	19/11/39
11. A. R. Withers, Nalpa Station, *via* Strathalbyn	251	6/4/40
12. J. H. Dawkins, Para Wirra Jersey Stud, Gawler River	24	7/4/40
13. F. J. Dodd, "Lallawa" Jersey Stud, Meningie	49	11/5/40

Advisory Board

The monthly meeting of the Advisory Board was held on Friday, 29th April, 1938, there being present Sir Wallace Sandford (Chairman), Messrs. S. Shepherd (Vice-Chairman), H. Wicks, F. Coleman, P. J. Baily, J. B. Murdoch, W. E. Ford, S. Williams, R. H. Martin, Hon. A. L. McEwin, M.L.C., Prof. A. J. Perkins, and H. C. Pritchard (Secretary).

Apologies were received from Messrs. A. J. A. Koch, C. A. Loxton, and W. J. Spafford.

Appreciation of Services.—The Board decided unanimously to record that not only the Advisory Board, but the State as well, were the poorer now that circumstances had necessitated Dr. Richardson's departure from South Australia, and to affirm their appreciation of the very valuable services which he had rendered to agriculture in this State. Dr. Richardson was a colleague with whom it was at all times a pleasure to work, and he carried with him the very best wishes of the Board.

Advisory Council of Education.—The Registrar of the Advisory Council of Education intimated that the Lieut.-Governor had appointed Mr. W. J. Spafford as the representative of the Advisory Board on the Advisory Council of Education for three years from 1st January.

New Branch.—Approval was given to the formation of a Women's Branch at Longwood.

New Members.—Approval was given to the addition of the following names to the rolls of existing branches:—Berri—D. H. Harrison; Black Springs—Bruce Kelly, Walter Harvey, Frank Pizzo; Brimpton Lake—E. K. Watkins; Bundaleer Springs—T. Shinnick; Butler—Geo. H. Parker; Carey's Gully—H. J. Miller, G. Neighbour; Charra Women's—Mrs. W. Trowbridge; Chilpuddie Rock—H. Marlow; Coonalpyn—C. G. Williamson, R. Bennett; Coonawarra Women's—Miss D. Pounsett; Gawler River—F. White, N. I. Robinson; Glencoe—L. W. Easton, E. M. Sims; Greenock—R. J. Wall, Les. Werner; Hanson—T. J. Hams; Keith—W. E. Gill, B. McBain, J. Buddle, M. Crooks; Keyneton—A. R. Zeunert; Kingston—W. S. Cooper, D. Cooper, N. R. Saltmarsh, Cliff. Starling, J. Payne; Kongorong—A. S. Dixon, R. Humphris, A. Itzerott, J. Itzerott, G. Morrison, A. J. Boardman, J. Storer, C. Storer, W. Crowe, J. H. Chant, Jack Chant, Jr., O. J. Sporer, R. Adams, E. Adams, L. A. McDonald, A. Praetz, Geo. McLean, A. Gust, A. C. Gust, E. Gust, S. J. McCall, D. R. Pasfield, L. Pasfield, T. F. Gratwick, Colin H. Black; Kyancutta—Leslie Miller; Milang Women's—Sister Naismith; Miltalie—John Bagnell Dud. Bagnell; Murraminga—Ross Alvin Battams, Chas. Bilney; Mundalla—E. H. Hunt, Ivan Dinning; Murray Bridge—N. B. Oliphant, W. R. Evans; Owen—A. Dillon; Owen Women's—Miss Joyce Marshman, Miss Connie Lake; Parrakie—R. J. Lillywhite, E. Geytenbeek; Paskeville—Ronald Esmond Bussenschutt; Pinbong—L. Berry; Port Elliot—E. Paschke, J. T. D. Cooper, H. T. Roberts, F. E. Durrant; Spalding—L. Sawley, J. B. Brown, R. Hunt, F. Howley; Stockport—Noel Kenneth Robbins, Graham Clayton; Tantanoola—E. A. Baker; Tantanoola Women's—Mrs. F. Langley; Tarlee—Schmidt; Warramboo Women's—Miss A. M. Simmons; Wolseley—Sydney A. Snoad.

New Branch—**Longwood Women's.**—Mrs. W. E. Marks, Mrs. C. W. Koehne, Mrs. E. W. Pfennig, Mrs. T. E. Bowen, Miss J. M. Bowen, Mrs. A. S. Harslett, Mrs. C. R. Coleman, Mrs. H. Wright, Mrs. H. G. Haines, Mrs. F. Thetford, Mrs. A. H. Robertson, Mrs. F. A. Sleigh, Mrs. H. R. Slater, Mrs. D. G. Work, Mrs. W. H. Hughes, Mrs. A. E. Porteous, Miss M. Porteous, Mrs. A. Hurford, Mrs. A. W. Cameron, Mrs. A. Braynard.

Life Members.—The honour of Life Member was conferred upon the following:—Messrs. O. B. Milard (Inman Valley) and J. F. Carter (Koppio).

Several items submitted by conferences and branches were dealt with.

The monthly meeting of the Advisory Board of Agriculture was held on Thursday, 2nd June, at 2.15 p.m., there being present Sir Wallace Sandford (Chairman), Messrs. S. Shepherd, A. J. A. Koch, S. Williams, F. Coleman, P. J. Baily, H. N. Wicks, Hon. A. L. McEwin, M.L.C., Mr. C. A. Loxton, Prof. A. J. Perkins, and the Secretary (Mr. H. C. Pritchard).

Apologies were received from Messrs. R. H. Martin, A. M. Dawkins, and W. J. Spafford.

Personnel of the Board.—The Secretary reported that Dr. A. E. V. Richardson had sent his formal resignation to the Hon. Minister who had thanked him for his services.

New Members.—Approval was given to the addition of the following names to the rolls of existing Branches:—Alawoona Women's—Mrs. L. Hocking, Mrs. F. Radeley; Berri—R. Telfer; Boor's Plains—M. Kennett; Brownlow, E. Ziegler; Carey's Gully, — Thomas, Brian Badenoch; Currency Creek—George Lewis; Frayville—M. J. Wilks; Goode—L. E. Dutschke; Kalangadoo Women's—Mrs. C. Moritz; Kongorong—C. Sears, P. Schinckle, L. J. Bird, C. Wilson, J. Schinckel, W. Butler, H. Northern, H. A. Wright, F. Kemp, G. Lightbody; Kybybolite, R. Holliday; Murraminga, Roy A. B. Bates; Murray Bridge, T. G. Obst, M. Cowen, Rex Jaensch; Mypolonga, G. G. Rowley; Parilla Well Women's—Miss E. McInerney; Penwortham, Jno. J. Pawelski; Pinbong Women's, Miss Thora Nottle, Mrs. Alfred Berry; Saddleworth—D. J. Bell, Allan Fraser; Sandalwood—A. C. Atkins, L. S. Norman; Sheoak Log Women's—Miss — Dunstan; Smoky Bay—F. Gregor, K. Harrison, C. B. Harrison, J. A. Tremaine, H. Jones, Robert Lovelock, Herbert Thomas, Donald Thomas, William Dunn, Frank Drew, Geoffrey Gregor; Taree—Sydney Molineux; Tatiara—Max. Dodd, Ralph Dodd; Ungarra—C. B. Tillbrook, J. G. Jericho, B. Treasure; Wandearah—Edgar Davidson.

New Branch.—Appila Women's—Mrs. A. Harvie, Miss F. Lange, Miss D. Bottrall, Mrs. M. Harvie, Miss G. Wurst, Miss S. Wurst, Miss V. Gobel, Miss L. M. Wurst, Miss S. Matters, Mrs. W. Lange, Miss B. Wurst, Miss K. Bottrall, Miss C. Catford, Miss I. Jeffrey, Miss H. Zanker, Miss R. Wurst, Mrs. L. J. Nayda.

Life Members.—Messrs. E. G. Allder (Coonawarra), Robert J. Cock (Petina), A. E. Milne (Tatiara), and P. M. Wilksch (Berri) were appointed Life Members of the Agricultural Bureau.

Several other items were also dealt with.

Parafield Egg-Laying Competition, 1937-38

Review of the Competition for the Month of May, 1938

[By M. W. AIRD (Poultry Advisor) and A. CLIFTON (Competition Attendant).]

The production for May shows a 10 per cent. increase over the April figures and 4 per cent. more than for the corresponding month for the previous test. At the beginning of the month a higher increase than 10 per cent. was anticipated; however, owing principally to a number of the pullets going into a moult, our expectations were upset somewhat.

A Light Sussex pullet, entered by Mr. A. G. Ferguson, has the best production to her credit for May. This bird laid 28 first grade eggs during the 31 days, including 12 eggs for the first 12 days of the month. Several pullets in the Light Sussex class were rather backward during April; however, practically all of them are now in production, and the possibilities of the Light Sussex as winter egg producers have been enhanced by the performance put up by Mr. Ferguson's pullet.

Mr. V. E. Williams's pullet did the best in the White Leghorn class. This bird laid 24 first grade eggs for the month. First place in the Black Orpington class went to Mr. C. R. Bolto's bird, which also heads the list for the whole of the Competition in regard to highest number of first grade eggs laid. She now has 48 to her credit.

A splendid trio of Black Orpingtons is the one entered by Mrs. A. R. Mayger. This trio laid 69 first grade eggs for May, and now has a score of 128, being the highest for any one trio in the whole of the test.

One death occurred during the month, being the first for the current test.

Rainfall Table

The following figures, from data supplied by the Commonwealth Meteorological Department, show the rainfall of the subjoined stations for the month and to the end of May, 1938; also the average precipitation for May, and the average annual rainfall.

Station.	For May, 1938.	Av'ge. for May.	To end May, 1938.	Av'ge. Annual Rainfall.
FAR NORTH AND UPPER NORTH.				
Oodnadatta	—	0·29	3·52	4·60
Marree	0·16	0·58	3·11	5·78
Farina	·06	0·65	3·32	6·30
Copley	—	0·96	2·61	7·72
Beltana	—	0·92	1·58	8·34
Blinman	0·05	1·31	2·66	11·64
Hookina	—	1·35	2·55	10·85
Hawker	0·03	1·34	2·88	12·04
Wilson	—	1·20	3·41	11·63
Gordon	—	0·97	3·04	10·25
Quorn	0·02	1·41	5·92	13·02
Port Augusta	—	1·09	3·44	9·38
Bruce	0·03	0·91	2·89	9·78
Hammond	0·06	1·02	2·94	11·02
Wilmington	0·07	1·94	4·58	17·17
Willowie	—	1·23	2·16	12·07
Melrose	0·20	2·53	7·19	22·79
Booleroo Centre	0·12	1·56	3·98	15·08
Port Germein	0·12	1·49	3·40	12·49
Wirrabara	0·18	2·06	6·19	19·13
Appila	0·23	1·45	5·77	14·55
Cradock	—	1·08	4·02	10·62
Carrieton	0·05	1·22	5·06	12·06
Johnburg	—	1·09	3·28	10·47
Eurelia	—	1·28	4·87	12·61
Orroroo	0·13	1·29	6·23	13·10
Nackara	—	1·24	2·35	11·09
Black Rock	—	1·25	3·70	12·24
Oodlawirra	—	1·14	3·72	11·37
Peterborough	0·04	1·28	3·71	13·11
Yongala	0·10	1·40	4·75	14·37
NORTH-EAST.				
Yunta	—	0·94	1·82	8·44
Waukaringa	—	0·84	2·28	7·85
Mannahill	0·08	0·78	1·28	8·06
Cockburn	0·51	0.95	0·87	7·85
Broken Hill	0·29	0·95	0·64	9·37
LOWER NORTH.				
Port Pirie	0·13	1·54	4·22	13·16
Port Broughton	0·21	1·64	5·56	13·82
Bute	0·23	1·83	5·84	15·36
Laura	0·13	1·84	6·16	17·88
Caltowie	0·16	1·76	5·96	16·65
Jamestown	0·13	1·80	6·51	17·63
Gladstone	0·13	1·68	6·01	16·24
Crystal Brook	0·14	1·75	8·42	15·72
Georgetown	0·08	2·07	6·28	18·17
Narridy	0·07	1·81	5·39	15·66
Red Hill	0·09	1·91	5·63	16·54
Spalding	0·14	2·07	5·38	18·51
Gulnare	0·03	2·13	5·60	18·37
Yacka	0·22	1·75	5·02	15·34
Koolunga	0·16	1·67	4·42	15·21
Snowtown	0·15	1·82	5·69	15·67
LOWER NORTH—*continued.*				
Brinkworth	0·13	1·82	4·47	15·60
Blyth	0·30	2·03	5·41	16·68
Clare	0·29	2·88	8·06	24·42
Mintaro	0·27	2·70	9·12	23·27
Watervale	0·47	3·06	9·59	26·66
Auburn	0·32	2·75	8·62	23·89
Hoyleton	0·43	1·97	7·13	17·27
Balaklava	0·13	1·81	4·80	15·34
Port Wakefield	0·20	1·55	3·68	12·90
Terowie	0·01	1·21	4·39	13·29
Whyte-Yarcowie	0·02	1·30	3·68	13·55
Hallett	0·16	1·65	6·02	16·37
Mount Bryan	0·18	1·76	6·75	16·74
Kooringa	0·09	1·96	6·61	17·75
Farrell's Flat	0·06	2·08	7·57	18·51
WEST OF MURRAY RANGE.				
Manoora	0·27	2·16	6·98	18·87
Saddleworth	0·30	2·22	8·21	19·58
Marrabel	0·42	2·18	7·94	19·90
Riverton	0·33	2·36	7·65	20·80
Tarlee	0·42	2·04	6·54	18·06
Stockport	0·45	1·79	7·41	17·04
Hamley Bridge	0·33	1·73	5·39	16·50
Kapunda	0·23	2·23	7·33	19·71
Freeling	0·23	1·89	6·59	17·73
Greenock	0·41	2·36	9·06	21·42
Truro	0·19	2·12	6·28	19·72
Stockwell	0·31	2·15	6·76	19·98
Nuriootpa	0·33	2·21	9·65	20·77
Angaston	0·57	2·46	9·25	22·29
Tanunda	0·58	2·45	7·53	21·94
Lyndoch	0·64	2·47	9·10	23·17
Williamstown	0·62	3·10	11·90	27·41
ADELAIDE PLAINS				
Owen	0·40	1·65	6·41	14·83
Mallala	0·17	1·90	5·74	16·39
Roseworthy	0·40	1·86	7·00	17·37
Gawler	0·74	2·27	8·04	18·81
Two Wells	0·58	1·84	5·04	15·75
Virginia	0·67	2·05	6·10	17·17
Smithfield	0·70	2·14	7·26	17·62
Salisbury	0·63	2·20	7·96	18·49
Adelaide	0·98	2·72	9·98	21·17
Glen Osmond	1·24	3·20	10·49	25·84
Magill	1·15	3·19	10·63	25·24
MOUNT LOFTY RANGES.				
Teatree Gully	0·65	3·34	11·66	26·83
Stirling West	1·98	5·49	20·07	46·86
Uraidla	1·61	5·32	17·57	43·64
Clarendon	1·41	3·90	12·71	32·74
Happy Valley Res.	1·29	—	10·53	—
Morphett Vale	1·09	2·66	9·59	22·56
Noarlunga	1·68	2·46	11·76	20·35
Willunga	1·65	3·41	9·27	25·91
Aldinga	0·93	2·43	6·54	20·11

RAINFALL—*continued.*

Station.	For May, 1938.	Av'ge. for May.	To end May, 1938.	Av'ge. Annual Rain-fall.
MOUNT LOFTY RANGES—*continued.*				
Myponga	1·21	3·74	9·82	29·45
Inman Valley	0·95	—	7·55	—
Yankalilla	1·17	2·87	6·23	22·70
Mount Compass	1·17	4·32	10·15	36·32
Mount Pleasant	0·34	2·98	9·46	27·02
Birdwood	0·44	3·17	11·80	28·86
Gumeracha	0·60	3·94	13·43	33·12
Millbrook Reservoir	0·75	4·45	17·09	34·00
Lobethal	0·90	4·01	14·38	35·79
Woodside	0·68	3·59	11·35	32·01
Hahndorf	1·00	3·89	12·87	34·65
Nairne	0·44	3·08	8·24	28·04
Mount Barker	0·55	3·67	10·65	31·17
Echunga	0·95	4·02	12·73	33·25
Macclesfield	0·70	3·29	9·06	30·29
Meadows	0·96	4·10	13·00	35·93
Strathalbyn	0·27	2·23	5·69	19·35
MURRAY FLATS AND VALLEY.				
Meningie	0·74	2·22	7·22	18·28
Milang	0·46	1·66	5·27	14·85
Langhorne's Creek	0·31	1·58	4·45	14·99
Wellington	0·56	1·57	5·29	14·68
Tailem Bend	0·79	1·75	6·26	15·19
Murray Bridge	0·26	1·43	3·58	13·51
Callington	0·06	1·60	3·03	15·14
Mannum	0·14	1·27	3·40	11·51
Palmer	0·12	1·62	5·30	15·70
Sedan	0·04	1·28	3·46	11·99
Swan Reach	0·12	1·20	3·32	10·60
Blanchetown	0·08	1·22	2·69	10·97
Eudunda	0·19	1·83	6·55	17·16
Point Pass	0·14	2·15	5·77	16·93
Sutherlands	—	1·16	2·42	10·73
Morgan	0·03	1·00	1·93	9·12
Waikerie	—	0·90	1·76	9·71
Overland Corner	—	1·06	2·08	10·21
Loxton	0·09	1·21	2·61	11·34
Berri	0·09	1·11	2·88	10·11
Renmark	0·07	1·04	2·27	10·37
WEST OF SPENCER'S GULF.				
Eucla	1·83	1·25	3·90	10·06
Nullarbor	2·61	1·20	3·98	8·79
Fowler's Bay	1·59	1·70	4·11	11·89
Penong	1·62	1·69	5·95	12·22
Koonibba	1·12	1·37	8·53	12·16
Denial Bay	0·97	1·33	7·49	11·31
Ceduna	1·07	1·35	7·38	10·30
Smoky Bay	1·14	1·34	7·14	10·42
Wirrulla	1·03	1·12	10·36	10·71
Streaky Bay	1·42	1·89	8·05	14·85
Chandada	0·72	1·28	8·71	12·31
Minnipa	0·64	1·47	9·23	13·83
Kyancutta	0·62	1·16	6·77	13·16
Talia	1·09	1·77	8·15	14·50
Port Elliston	1·68	2·07	8·81	16·44
Look	0·48	1·73	8·17	16·23
Mount Hope	2·03	—	8·95	—
eelanna	1·10	1·96	7·54	15·92
Cummins	1·38	2·04	8·38	17·47
Port Lincoln	1·13	2·33	7·74	19·27
Tumby	0·42	1·52	6·19	14·16
Ungarra	0·70	1·85	5·94	16·81
Port Neill	0·49	1·33	5·87	13·06

Station.	For May, 1938.	Av'ge. for May.	To end May, 1938.	Av'ge. Annual Rain-fall.
WEST OF SPENCER'S GULF—*continued.*				
Arno Bay	0·39	1·29	4·67	12·72
Rudall	0·44	1·46	5·97	12·94
Cleve	0·40	1·72	6·55	14·90
Cowell	0·31	1·15	3·04	11·06
Miltalie	0·26	1·52	5·22	13·72
Mangalo	0·18	1·53	4·53	13·80
Darke's Peak	0·52	1·61	5·62	15·08
Kimba	0·18	1·22	4·60	11·64
YORKE PENINSULA.				
Wallaroo	0·50	1·84	6·01	13·93
Kadina	0·67	1·95	7·01	15·53
Moonta	0·40	1·92	6·43	14·98
Paskeville	0·50	1·87	5·83	15·47
Maitland	0·57	2·52	9·60	19·76
Ardrossan	0·30	1·66	5·42	13·91
Port Victoria	0·51	2·04	6·74	15·33
Curramulka	0·30	2·04	5·32	17·72
Minlaton	0·43	2·15	7·25	17·65
Port Vincent	0·48	1·52	4·00	14·26
Brentwood	0·88	1·85	6·46	15·52
Stansbury	0·55	2·03	5·24	16·75
Warooka	0·70	2·25	6·47	17·38
Yorketown	0·95	2·06	6·11	16·81
Edithburgh	0·70	2·01	6·97	16·31
SOUTH AND SOUTH-EAST.				
Cape Borda	2·23	3·16	9·67	24·83
Kingscote	1·90	2·49	7·17	19·20
Penneshaw	1·35	2·02	6·52	19·09
Victor Harbour	0·50	2·53	7·16	21·37
Port Elliot	0·55	2·41	7·08	19·93
Goolwa	0·53	2·16	8·03	17·85
Maggea	0·26	0·93	2·91	10·32
Copeville	0·61	1·22	4·81	11·64
Claypans	0·45	1·02	3·58	10·77
Meribah	0·04	1·36	3·16	11·26
Alawoona	0·04	1·28	2·83	10·43
Caliph	0·42	0·91	3·53	10·60
Mindarie	0·26	1·36	3·71	12·16
Sandalwood	0·31	1·66	4·11	13·67
Karoonda	0·32	1·84	4·25	14·33
Pinnaroo	0·03	1·66	4·03	14·14
Parilla	0·13	1·65	5·66	13·67
Lameroo	0·16	1·83	5·76	15·79
Parrakie	0·16	1·79	4·68	14·58
Geranium	0·28	1·96	5·81	16·36
Peake	0·51	1·85	5·78	15·87
Cooke's Plains	0·67	1·56	6·98	15·33
Coomandook	0·56	2·05	6·69	17·01
Coonalpyn	0·48	1·89	6·84	17·65
Tintinara	0·72	2·23	7·16	18·68
Keith	0·46	2·25	6·92	17·95
Bordertown	0·45	2·04	6·21	19·16
Wolseley	0·19	1·97	5·20	18·50
Frances	0·44	2·14	7·41	20·18
Naracoorte	0·64	2·43	7·88	22·64
Penola	0·80	2·90	7·68	25·89
Lucindale	0·90	2·58	9·09	23·48
Kingston	1·47	3·05	6·73	24·24
Robe	1·79	3·06	6·29	24·63
Beachport	2·48	3·18	9·36	27·06
Millicent	2·89	3·44	12·88	29·93
Kalangadoo	1·44	3·63	12·11	32·00
Mount Gambier	1·78	3·40	10·20	30·29

Agricultural Bureau of South Australia

Reports Received from Branches

The following is a list of the Branch reports received during the month, and shows the date and principal subject of each meeting:—Allandale East, 13th May, Conference report. Appila Yarrowie, 6th May, discussion *re* Conference. Balumbah, 5th May, address, H. D. Adams. Baroota, 9th May, discussion; 7th March, "Power Farming *v.* Horses," J. Spencer; 11th April, "The Wool Industry," C. A. Goddard. Beetaloo Valley, 16th May, "Sheep Raising," J. Fradd. Blewitt Springs, 10th May, "Pruning," H. H. Orchard. Boor's Plains, 7th April, "Benefit of Heavy Super Dressings," C. Rodda. Brimpton Lake, 12th May, "Seeding," P. H. Wagner. Brinkley, 14th April, address, C. H. Pearson; 11th May, address, H. A. Follett. Bute, 6th May, discussion. Butler, 24th April, discussion, Grassland Cropping. Cherry Gardens, 13th May, "Cleaning Up," I. L. Stone; 9th April, discussion, Soil Erosion. Clarendon, 28th December, "Hay Growing," E. A. Harper; 10th April, "Producing Autumn Eggs," S. Eyles. Coomandook, 29th April, discussion. Coonalpyn, 11th May, "Importance of Seeding Preparation," R. V. Potter. Currency Creek, 16th May, "A Plea for Increased Production," W. Saltmarsh; 11th April, discussion, Noxious Weeds. Devlin's Pound, 19th April, address, C. A. S. Hawker, M.H.R.; 28th April, "Marketing Wool," C. A. Goddard. Frayville, 10th March, discussion; 12th May, Question Box. Glencoe, 3rd May, "Silage Making," E. S. Alcock. Goode, 18th May, discussion. Green Patch, 12th May, "Dairying," P. Pope. Hartley, 11th May, address, A. G. Strickland. Hilltown, 3rd May, discussion. Inman Valley, 12th May, "Cattle Dehorning," H. B. Barlow. Jamestown, 21st March, Annual Meeting; 19th April, paper, "Experiments at Kybybolite"; 16th May, "Agriculture in Other Lands," J. A. Lyons, M.P. Kelly, 7th May, addresses, H. D. Adams and W. J. Taylor. Keyneton, 11th May, Question Box. Kongorong, 2nd May, Question Box. Kyancutta, 3rd May, Wool Reports. Lenswood and Forest Range, 29th April, formal. Light's Pass, 9th May, moving picture show, A. Rensch. Lobethal, — March, "Cement Concrete," W. Moore; 21st April, "First Aid," St. John Ambulance Brigade. Lyndoch, 12th April, discussion; 10th May, "Poultry," J. B. Ruediger. McLaren Flat, 12th May, address, F. Trott. Miltalie, 9th May, "Benefits Derived from the Agricultural Bureau," J. P. Story. Monarto South, 23rd April, "Rugging Sheep," H. Hartmann. Mount Barker, 27th April, "Foot Rot in Sheep," L. H. Laffer. Mount Hope, 17th May, "Modernising the Homestead," L. A. Myers. Mount Pleasant, 4th May, "Wool Production and Marketing," C. A. Goddard. Murraminga, 7th May, "The Agricultural Bureau," F. H. Jones. Mypolonga, 19th May, Question Box. Nantawarra, 19th May, paper from *Journal.* Narridy, 7th May, "Care of Tractors," R. P. Klopper. Nunjikompita, 12th May, annual meeting. Penola, 13th May, "Possible Improvements in Stock Raising," N. J. McBain. Penwortham, 19th April, "Hints on Fencing," J. Alcock. Port Elliot, 26th March, "Pastures and Weeds," W. J. White. Pygery, 10th May, "Trees for Mallee Areas," A. Day. Redhill, 15th April, formal. Rosedale, 10th May, "History of Turretfield, F. E. Waddy. Shoal Bay, 10th May, discussion. Smoky Bay, 21st May, re-opening meeting. Spalding, 12th May, "Th3 Wool Industry, C. A. Goddard. Springton, 13th April, address, R. L. Griffiths; 3rd May, "Wool Production and Marketing," C. A. Goddard. Sutherlands, 5th May, "Care of Harness," O. B. Schiller. Tarlee, 10th May, "Some Aspects of Forestry," G. J. Rodger. Truro, 16th May, "Pasture Improvement," R. C. Scott. Upper Wakefield, 2nd May, debate with Whitwarta Branch. Wallala, 14th May, "Setting the Plough," A. Agars. Warramboo, 14th April, "Review of Past Season," A. Collins. Weavers, 28th February, "Superphosphate," O. Bowden; 11th April, paper from *Journal.* Willowie, 9th May, combined meeting with Women's Branch. Wilmington, 2nd May, address, E. L. Orchard. Yadnarie, 11th May, "Charcoal Burning," K. N. Gillen.

Papers Read at Branch Meetings

Pastures and Their General Improvement.

[A. G. Lillecrapp (Keyneton).]

For successful pasture improvement in any district due regard must be paid to choosing the right pasture plants, the correct fertilizer treatment, and above all to the proper utilisation of the pasture growth obtained. Pasture grasses are only productive when plentifully supplied with phosphorus and nitrogen, whereas pasture legumes which obtain atmospheric nitrogen through the agency of bacteria located on their root nodules, need only be supplied with phosphorus, otherwise superphosphate, for full productivity. The nitrogen fixed by the bacteria of legumes becomes distributed throughout the plant and is thus available to the grazing animal, which returns approximately 50 per cent. of this nitrogen to the soil in its droppings. It is interesting to note further that South Australia has the smallest acreage amenable to intense pasture development because within its boundaries there is a lesser area on which the rainfall exceeds 20in. per annum than is the case in any other State in the Commonwealth. It is obvious, therefore, that if we are to compete successfully with the other States in intense livestock husbandry we must develop to the fullest extent the suitable pasture land in the areas receiving greater than a 15in. rainfall. Our natural pastures are good in good seasons, but there are generally some months in the year when they are lacking in something in our present uncertain seasons. I propose to touch on the various grasses that are adaptable to our own district and to give a few details about each one.

Paspalum.

One property immediately comes to my memory; granting its soil fertility, but the land is sown with Paspalum and looks like a lawn. It is carrying 10 sheep to the acre all the year round and has done so for many years past. Years ago I was under the impression that this grass would only grow where the soil was relatively rich and fairly wet, but I know now that this is not the case, and that Paspalum will grow almost anywhere. We have a lot at home and it is gradually working its way away from the creeks, where it was first planted, into ground of a definite sandy nature. Stock do not like it too rank, and consequently it is far better to keep it eaten right down; it will certainly never be injured by doing so. It is not a very vigorous winter grower, though far from dormant. It will become root bound, which in turn tends to reduce its productivity. It likes a lot of super. Most pastures like super, and it pays to give it to them. Lastly, it is hard, although not impossible, to eradicate it if desiring to turn the paddock into crops again. To prevent it becoming root bound it is best to plough it up every 6 or 7 years and broadcast 2lbs. of Rye grass and 2lbs. of Subterranean Clover on it, before harrowing it down. The best time to do this is during April or May. This checks the growth temporarily and enables the Paspalum to form a new root system. For lack of winter growth a grass that can be sown to advantage with it is Kikuyu. Although Kikuyu is a summer grass it produces more winter feed than Paspalum and is the only grass that can hold its own with it over a long period of years. Lastly, to eradicate paspalum, plough it in in the autumn and work it down as best you can. A month or so later broadcast a winter fodder crop such as peas, oats, or barley. After removing this fodder crop keep the land worked during the summer months and sow it in the following autumn. It may sound a long process, but one certainly gets some benefit from the land while doing so So much for its disadvantages. It is a vigorous summer grower, very hardy, and will grow in practically any locality. It absorbs atmospheric moisture and is liked by all classes of stock. It does not die out like many other grasses, if the heart of it is eaten out for months on end. It can be sown in the autumn or spring, preferably the autumn, at the rate of 12lbs. of handshaken seed per acre.

Hand-Shaken Seed.—Many grasses have very delicate seeds, and Nature leaves the glumes on the seeds to protect them, which means that one buys several pounds of Cocky-chaff with the seed.

RYE GRASS.

There are very many varieties, including Rigid Rye Grass, Drake Rye Grass, Wimmera Rye, Italian Rye and Perennial Rye Grass. The two that mostly concern our district are Wimmera Rye Grass and Perennial Rye Grass, mainly the former. From a pasture point of view rye grass is undoubtedly proving its worth. It has been grown in this district for quite a number of years and is probably the most adaptable of all our grasses to varying conditions of soil fertility and varying climatic conditions. It can be established very easily and very cheaply and is therefore the most popular grass for turning the heavy nitrogen supplies of old clover land into money. It also makes relatively good winter growth. Rye grass gives its great bulk of feed in the late spring, a time of the year when we least need it. It is a very heavy nitrogen eater, quickly going out if the clover with which it is sown is not regularly supered. From a pasture point of view clover must be sown with it. In time it will exhaust nitrogen supplies unless sown with a clover. Sown on its own, together with the compacting of the soil surface, it will prove unproductive in about 4 or 5 years. Its greatest use undoubtedly is as a part of a pasture mixture; on other soil alone it becomes purely a temporary pasture. As a permanent pasture it must be sown with other grasses and not on its own.

Perennial Rye Grass (*Lolium perenne*) together with White Clover, under suitable conditions forms the ideal pasture, of which New Zealand and some other parts are making such successful use. However, in our district conditions do not favour it so well. Certified New Zealand Hawk's Bay seed has been tried out at the Kybybolite Research Station, at the Waite Institute and other places, and in all cases has failed after four years. In this connection we must remember that we have a Mediterranean climate, having a heavy winter rainfall and a definite summer drought period. We can never hope to establish the dense stands of Perennial Rye Grass which are found in New Zealand districts having the added advantage of assured summer rains, until a more drought-resistant strain can be produced. The Perennial Rye Grass being grown in this district is certainly doing very well. Time, however, will prove its adaptability. Wimmera Rye out in our hills country has not only provided good feed every year but has spread over quite a large area since first planted in 1933.

Phalaris tuberosa.—This grass is unique in the fact that it is the only grass so far investigated that will produce an abundance of feed in the winter months. It is very persistent and will withstand heavy grazing indefinitely. At Mount Crawford I have seen it literally covered in water; it was then about 2ft. in height and looking very healthy. Water seems to have no effect upon it, whereas it would kill a lot of grasses at that time of year. It is best to feed it rather heavily if to be of much value to sheep, but it makes an ideal grass for cattle during the cold winter months. The shortage of feed in the winter should receive more notice, as it is nearly as big a problem as the shortage of feed in the late summer months, if not as great. The lack of summer feed has been overcome with the adaptability of Lucerne, and Phalaris may yet overcome the problem of winter shortage. Unfortunately, it is a very delicate plant in the first three months of its growth, therefore needing very careful soil preparation in order to be as fine and as near weed free as posible. Further, the seed is costly, although cheaper now, and it has been found that 2 to 3lbs. per acre give very good stands. Since Phalaris is a perennial, pastures should not be planted with it if desiring to crop the land in the near future. Where a perennial pasture is desired to give autumn, winter and spring feed, a mixture of 3lbs. of Phalaris and 4lbs. of Early Subterranean Clover with at least 1cwt. of super per acre will give excellent results. This mixture should be seeded in the early autumn on a well-worked fallow, free of weeds. With Perennial plants like Phalaris an even stand over the surface of the land is desirable. This can be done by removing the drill tubes and letting the mixture of seed and super spray out on to a sloping board which can be fixed under the drill rows, and then follow it up with light harrows. During the first year the pasture should be lightly grazed to reduce weed competition, after which, however, Phalaris will withstand heavy grazing without damage; but for full productivity, at least 1cwt. of super should be supplied annually. This not only encourages the Phalaris directly, but indirectly because of the nitrogen made available following the stimulation of its associate—Early Subterranean Clover. As Phalaris seed averages 5s. per pound, seed production is often a profitable side line. If seed or hay is the aim, spelling the pasture from mid-spring is desirable. Harvesting is carried out when the top of the seed-head is ripe, and a fair return appears to be about 100lbs. to 120lbs. per acre. It makes excellent chaff for all classes of stock, and particularly sheep. To make nutritious hay Phalaris must be cut just when the flower heads begin to appear. If cut too late, the hay is coarse, light and unpalatable. Phalaris will persist in both first and second class soils, but it yields better feed in bigger quantities on the former type of soil. It is not as palatable as Rye Grass in the green state, but when made into hay it is relished by all stock. Like Rye Grass, it will produce feed most of the year round, its summer growth being quite surprising. However, it should never be sown with Rye Grass alone; Rye grass has a depressing effect on the establishing of *Phalaris tuberosa.*

CLOVERS.

Subterranean Clover is the best known in our own district, but there are many more clovers which deserve more notice than they get now. The three most important clovers to us from a pasture point of view are Subterranean, Strawberry and White Clover. Subterranean Clover seems to be able to adapt itself to almost any soil, providing there is sufficient rainfall. It germinates with the autumn rains, if heavy enough. The young plants make some growth during the winter months, and by the end of August will have produced a thick mass about 3 or 4in. high. When the warm weather of spring arrives they grow very rapidly and remain green, whilst continuing to grow until really hot weather is experienced, when they dry up. The possession of this characteristic of making an early germination, slow winter growth, rapid growth in the spring, and maturing when the hot weather arrives, means that full returns from this clover can only be secured in districts having a relatively cool spring, which ensures a long growing period. Subterranean Clover needs an abundance of super to get the best from it. Clover is a very valuable feed even when mature, but unfortunately a heavy rain seems to spoil it in the summer, and frequently early in the year you may have some seeds germinate by such rain. Subterranean Clover, although known as a roadside weed in Europe for a long time has been proved in South Australia to be a really high class fodder plant, and this result is wholly due to the efforts of the late A. W. Howard of Mount Barker. The power of burying its seed below the soil's surface renders Subterranean Clover equivalent to a Perennial. Individual plants of Subterranean Clover will possibly cover a circle 3ft. across, whilst a good stand will cover the whole land with a dense mass of growth about 12in. high. It needs a temperate climate with a fairly high rainfall, although 20in. is ample, and a long growing period is needed to produce maximum returns. Almost all types of soil will produce it. Much of the value of clover depends on the fact that it will grow on really sour soils, provided that plenty of super is applied to the land. Seed must be sown in time to germinate before the cold weather of winter sets in. The seed can either be drilled or broadcast. It can be used by livestock when green or as dry fodder. Analysis of Subterranean Clover shows this foodstuff to be high class fodder, equal in fact to lucerne hay. All clovers are wonderful soil renovators, helping in the collecting of much nitrogen and greatly increasing the organic matter contents of the soil. It is also a good soil cleaner, choking out most of the ordinary home weeds. The only enemy to clover is the lucerne flea, but for pasture purposes the flea has no effect; it is mainly in seed crops where the flea causes undue damage.

It is through the introduction of Subterranean Clover and the application of super that our South-East has become so productive. Subterranean Clover has established itself naturally in this district, but there is still room for more. Surface renovation can be done to advantage in the autumn; put out plenty of super and in this locality Nature will do the rest.

Strawberry Clover is also quite a good one, although it likes rich soil. It is thoroughly persistent and produces a great bulk of feed well on into the summer, its roots, like lucerne, tapping the sub-soil. It is very aggressive, its runners quickly claiming the surrounding soil. Its feeding qualities are also very similar to lucerne. Going as it does into the sub-soil, it collects more minerals than Subterranean Clover, which is shallow rooted. Unfortunately, the clover is hard to establish from seed. Science has attributed the cause of this to a hard outer seed-coat which is impermeable to water. They treat it now by rubbing in some way with emery cloth, and germinations are just as good as Subterranean Clover. There is also a good variation of strains. Seed of high quality is costly, but there are 350,000 seeds (approximately) to the pound, and only half a pound is necessary per acre.

White Clover has very much the same habits as Strawberry Clover, but its leaves are smaller and very much more palatable, especially to the lucerne flea. New Zealand certified White Clover is a good strain to purchase, being only 3s. 6d. per lb. Red Clover is another good one, taking pride of place in many pasture mixtures, as it keeps green a long time and is very much liked by all classes of stock.

GRASSES.

Cocksfoot is a perennial grass and is very useful for inclusion in autumn sown pasture mixtures containing Rye Grass, as its main period of growth is in the spring, summer and autumn. Kikuyu Grass, mentioned earlier, is very drought-resistant, but unfortunately does not seed and has to be planted from roots. Kentucky Blue Grass is another good one. Burr Medic, Barrel Medic and Evening Primrose are all grasses which find their way into our pasture mixtures.

LUCERNE.

Lucerne has become so popular in recent years that although termed a cultivated crop it is gradually being turned over to pasture. There is no doubt that it is the finest standby we have for the summer's lack of feed. In this locality, particularly the Keyneton district where clay is not far away, it is adapting itself most readily. Lucerne is easily the best plant we have for the production of green fodder, and is particularly adaptable for cutting and carting to the animals being fed upon it. From a pasture point of view it is generally recognised that thick stands of Lucerne making strong luxuriant growth, either watered or not, have to be carefully introduced to stock. Once stock are accustomed to it all is well, but if not accustomed to it they are liable to bloat. Grazing Lucerne tends to shorten the life of the stand, because it is thinned out much more quickly than if stock never had access to it. In dry districts the value of Lucerne as a grazing pasture commends itself to stockowners. Being very drought-resistant it often provides acceptable green feed when other succulent fodder is scarce or nonexistant; and after a long dry spell it is almost an axiom that Lucerne is the first plant to grow when rain does come. Lucerne should not be heavily stocked in the first season of its growth; the plants then are not sufficiently strong to withstand the inevitable tramping. Again, it will not stand continuous grazing at any time, and the method should be to put on sufficient stock to eat it down quickly, and move them off before the young plants have commenced to shoot out again. It is slowly being proved however, providing clay is present fairly near the surface, that this district can produce good stands anywhere. We have been fortunate in recent years to have a good deal of rain in the summer months to establish good stands, and these will be ready to withstand our natural summers.

PASTURE DEVELOPMENT.

Pasture development takes forethought, careful cultivation, and correct mixtures of grasses. It is definitely a paying proposition, and it is becoming more and more necessary to do something in this respect.

When sowing pastures, seed and super should only be mixed as required, since the germinating power of seed is greatly reduced when left in contact with super for any length of time. In their first year permanent pastures should be judiciously grazed to give them every chance for healthy development. It appears that most perennial pasture plants, such as Phalaris Tuberosa, White and Strawberry Clover, and to a lesser extent Perennial Rye Grass, need at least a year to become firmly established. Annual pastures like Wimmera Rye Grass and Subterranean Clover should receive an autumn cultivation occasionally to prepare a suitable seed bed for the germination of the seeds. Spelling of the pasture in the spring is often necessary to ensure a good seeding of Wimmera Rye Grass. It certainly looks a very tough and wiry grass to eat, but there is no doubt stock are very fond of it and do well on it.

With all pastures an annual top-dressing of from 1 to 2cwts. of super, depending on soil fertility, should be given with the first autumn rains. Many landholders prefer to give their super dressings in the spring, and others apply dressings both in autumn and spring. However, whilst two applications may be of advantage, especially to lucerne, it would appear that where only one dressing is to be given, the autumn is the correct period of treatment. You may say, why? It is done to encourage the growth of herbage at a time of the year when pasture development is relatively slow. Repeated applications of sulphate of ammonia to a well-balanced grass-clover pasture depress the clover development and lower production, whereas this fertilizer assists in establishing pasture on poor quality land which has not previously carried a good crop of clover. Under such circumstances the addition of ½cwt. of sulphate of ammonia to the usual phosphate dressing is an advantage. If you had a good deal of clover land, and some that had very little, the addition of the ammonia at seeding time will stimulate the early growth necessary to establish the clover and it would probably never need any more of it.

When good pastures have been established subdivision into small areas and the practice of systematic grazing will greatly increase the stock carrying capacity of the farm. Where the paddocks are very small and an intensive system of pasture production is going on, it is necessary to drag light harrows or some such appliance, designed by yourselves, over the pasture to break up and distribute the droppings of stock over the whole paddock. This is best done after a rain when it is moist and easily broken up. This procedure may sound unnecessary, but under intensive pasture methods it is absolutely necessary, especially when cattle are kept, in order to prevent the growth of rank unpalatable patches of pasture. Although up to date very little has been done with pasture renovation in this district, or in this State, it is generally recognised that an annual or biennial surface cultivation in the autumn with pasture harrows or some such implement greatly improves general production.

When the flush of growth commences in the spring, the period between grazings of each paddock should be shortened and a number of fields closed up for meadow hay and ensilage. By so utilising the flush of growth in the spring the maximum number of stock can be carried throughout the whole year. The pasture is ready to cut for ensilage shortly after the clovers have passed the period of full bloom and the grasses are well in head. By doing this you get excellent growth in that paddock after cutting, and it is said that the feed is infinitely better in its second growth than in the first. It would not be so sappy but harder and better for the stock.

In our cereal cultivation country pasture improvement must fit in with cereal cultivation, and as a result must of necessity be mainly of a temporary nature. Where cows and horses are the main animals to be fed, hay, ensilage and natural grassland fill the requirements. However, with the recent low prices of cereals many farmers have turned more and more to sheep, and consequently pasture improvement is finding a definite place in the farming practice. In the past many farmers have found that oats and super drilled on to wheat stubbles were one of the best ways of increasing the value of grazing in the year following the wheat crop. Such forage oats can be grazed as green feed once or twice, and then a portion can be reserved to build up a supply of hay or grain, depending of course on the season. This has overcome the difficulty to some extent, but a temporary pasture is far more to be what is generally required in our locality. Lucerne, Phalaris Tuberosa and Paspalum are more of the nature of permanent pastures, so we are left with the Medics and Rye Grasses if a definite pasture is required; but a mixture of these would be quite all right. Now the question arises as to what actually to sow.

A good pasture should provide succulent feed all the year round, although this is impracticable in many localities, as the summer grasses prove too vigorous and crowd out the winter grasses. In such cases one has to make two distinct pastures, one for summer and one for winter. Good pastures should be free of weeds. If you allow weeds to obtain a hold on a pasture it will be practically impossible to convert it again into good condition without resowing. There is no doubt that where possible a mixture of pasture grasses is preferable to a lone variety. Under natural conditions many different species of plants intermingle, and again different plants require different plant foods in different proportions, so that plant food not utilised by one species may be absorbed by another. A combination of grasses not only provides a more varied ration for stock, but the varying habits of the different species ensure a more satisfactory pasture in other ways. To lay down pastures of individual grasses is often unwise. For example, if a pasture of Cocksfoot alone is laid down, the tufts produced are not only unsightly but coarse; whereas when Cocksfoot is mixed with Clover and Rye Grass a more uniform cover is produced, and the pasture is improved in quality.

To the sheep man, the quality of the pastures is of prime importance. If the ewes are in good condition and on good pastures at lambing time the lambs are strong and do not suffer any check in growth. Good succulent feed will ensure a bigger percentage of lambs than is the case where pasturage is dry and scanty. The most critical period of a sheep's life is during the first 12 months of its existence, for it is then that the animal largely builds up the framework on which to produce its wool and mutton. A strong virile constitution, together with good pastures, enables the animal to withstand disease and produce a good class of wool, free from break and other detrimental features. The demands of the market for fat sheep of any kind and especially export lambs are that they be free of grass seeds. By the use of Rye Grass, Lucerne, &c., stock can be marketed free of this seedy material. Improved pastures therefore are valuable in that they provide more and a better class of wool, more meat and produce a sheep with a good constitution. To the dairy farmer also good pastures are a profitable investment. If stock have access to succulent pastures they are less liable to become affected with such troubles as rickets, bone-chewing, &c., which are generally associated with poor pastures. Much poor land will produce infinitely better feed if it can be broken up and sown with suitable grasses and clovers. On some of the country on which implements cannot be worked, winter growing plants will often establish themselves by broadcasting the seed in suitable places. By having numerous small paddocks, rather than a few big ones, a system of rotational grazing can be adopted, and by doing this the various pastures can be grazed at a time when they contain a maximum amount of nutritive material. The grasses and clovers can thus be handled in such a way as to give them a chance to rest and recuperate and seed at the correct time, thus maintaining the maximum degree of efficiency in all pastures. If the property is well subdivided the pastures can be utilised when the feed is most nutritious. Milking cows require palatable feed rich in protein, and the grasses should be fed off when the growth is young, for as the plants mature the fibre content increases and the percentage of protein diminishes.

Phalaris Tuberosa it is commonly throught is best sown on its own, but this is not the case. Phalaris 4lbs. and Lucerne 2lbs. sown in the autumn makes an ideal pasture. Phalaris Tuberosa and all Clovers make another ideal pasture, and lastly Phalaris and Rye Grass sown with Clover is a good pasture.

Pastures Mixtures Suited to the District.

(1) Phalaris Tuberosa, 3lbs.
Wimmera Rye Grass, 3lbs.
White or Sub Clover, 2lbs., sown in the autumn.
(2) Paspalum, 12 lbs.
Lucerne, 2lbs., sown in the autumn.
(3) Phalaris Tuberosa, 4lbs.
Lucerne, 2lbs., sown in the autumn.
(4) Cocksfoot, 4lbs.
Tall Fescue, 4lbs.
Perennial Rye, 8lbs.
White Clover, 2lbs.

A balanced pasture does not need many grasses, 3 or 4 grases should be found ample in most cases. A paddock sown for crop in 1936 had Cocksfoot and Perennial Rye mixed with the manure, and it certainly did very well. However, now it is difficult to find any Perennial Rye, whereas the Cocksfoot is quite prolific.

The use of fertilizers such as super. stimulates the growth of grasses and legumes, and the amount of mineral matter in the plants is increased, particularly the elements lime and phosphorus, which are essential to the animals' development. Stock grazed on pastures deficient in these generally do poorly, but by feeding the pasture plants with fertilizers the composition of the feed is considerably improved. Where a marked increase in the lime content of the soil takes place the percentage of nitrogen in the pasture also increases. Stock always prefer the top-dressed portions of a paddock to the unmanured sections because:—

(1) They obtain more lime and phosphorous, two essential substances.

(2) The top-dressed pasture is more palatable and nutritious and contains a far greater amount of protein.

Therefore by nourishing the pastures not only is a greater quantity of feed obtained but also feed is considerably increased in nutritive value. It has been demonstrated for many years past that by top-dressing pastures the growth of the better-class grasses is encouraged, and the development and seed production of clovers is increased. Clovers are the most economical form in which to supply protein to animals, and it is expedient that growing stock, animals producing and rearing young, and cows in milk should receive large quantities of this nitrogenous material which is so essential to their well being. Stock grazing on pastures remove from the soil an amount of fertility that corresponds to the quantity of meat and milk produced from the pasturage consumed. To counteract this loss in fertility of the soil fertilizers must be applied in liberal quantities.

Horses v. Tractors.

[A. M. Twartz (Sutherlands).]

A farmer in this district must have at least 1,000 acres of arable land. If he crops 200 acres each year he will have a five-year rotation. To fallow 200 acres each year he will need 8 working horses, one spare horse, and two breeding mares. He will need a 6-furrow plough or a 15-tine cultivator according to the condition of the soil. Of the 200 acres some will have to be cut for hay, and to make 30 tons of hay he will have to cut 30 to 35 acres of the best of his crop. He will need stabling for 9 working horses, a chaffcutter and engine with shed. Of course, by feeding cocky-chaff the cost of production can be reduced. The horses do very well when fed on good cocky-chaff.

To fallow 200 acres he will have to start as soon as possible after seeding to be finished by September. It is not wise to work the horses for more than 8 hours per day. The attendant will have to rise at 5 a.m. to feed, water, and groom his horses and clean the stables. On some farms they have a small paddock into which the horses can go after their evening meal. One day a week will have to be set side for cutting chaff, drawing out shares, general repairs, breakages, also going to the local town. If a farmer can plough 8 to 10 acres per day at an average of 8½ hours, he is doing exceedingly well. Then he has to allow for rainy days. At harvest time the farmer must have a header, harvester or stripper large enough to work half his team one day and the other the next. I mention this because it is handier to get in other horses in the morning than at midday when it is good thrashing weather.

Costs of Horses.

11 horses and harness, swings, etc., at £18	£198	0	0
30 tons hay, including chaffing	37	10	0
Stable for 11 horses, thatch roof	30	0	0
Engine and cutters, galv. iron roof	135	0	0
Fallowing 200 acres, 5s. per acre, chaff, 40s., including man 7s. 6d. per day	50	0	0
	£450	10	0

The Tractor.

The cost of a tractor to take a 6-furrow plough would be about £450. Some seem to think that the horse team will go around the section the same number of times per day as the tractor, but experience has shown that where the horse team will go around the land twice, the tractor will go three times. Of course, the tractor can be set to any speed desired by altering the governor. There is never an unnecessary stop with the tractor. In the morning one can start as soon as it is light enough; in fact, moonlight is sufficient for ploughing. One can continue well into the night, when the horse team must be rested. Usually the tractor is stopped every three hours, but stops may occur through dirty kerosene or from magneto trouble. A half-hour for dinner is the usual thing. The cost of kerosene is about one gallon per acre, with the steel wheels and slightly less with pneumatics, which can take a bigger load. The oil has to be changed every 50 to 70 hours' work, which needs 3½ gallons, and a half-gallon to fill up later.

The upkeep of a tractor is practically nothing for the first two years except for kerosene, oil and grease, and the valves need grinding in every 1,000 working hours. The tractor should be loaded as nearly as possible to the full load, as the consumption of kerosene will be the same with half the load. Where a farmer has more than one team going he should have one tractor. The tractor should always be used for the hardest work and the work that is furthest away from the homestead. The horses should be called upon to do the easiest work such as ploughing out corners and harrowing. Many distributors of tractors advocate filling tubes with one-third water and two-thirds air to made up the weight of steel wheels. However, the pneumatics with the weights without the water should be the best in the long run. The pressure in the tyres is from 9lbs. to 11lbs. per square inch. Crude oil tractors are deerer to buy in the first place, but the cost of running is considerably less. It is not advisable to use a tractor and no horses. Horses cannot be dispensed with either on a small or a large farm. The work can be done more quickly and at the right time, especially at seeding and harvest time. Where the horse team can do 8 to 10 acres per day the tractor will do 12 to 15 acres, and if one cares to work at night this acreage can be increased by 4 or 5 acres.

Costs of Tractor.

Cost of tractor (steel wheels)	£450	0	0
Kerosene, petrol, &c.	12	0	0
Oil, grease, etc.	5	0	0
Tractor shed	10	0	0
	£477	0	0

A farmer starting on a new place would not have to erect costly stables. This outlay would be put towards buying a tractor.

Dry Sowing.

[R. M. Spriggs (Yadnarie).]

Under the present conditions almost every farmer asks himself the question.—"Shall I start sowing." Some are in favor of dry sowing and others are not. If the rain hangs off too long one usually makes a start, and in such cases a start is generally made on the piece of land most suitable for the purpose. When choosing this piece of land, there are two points to consider.—(1) Freedom from weeds, (2) Nature of the soil.

It is very hard to find a paddock free from weeds in this district, not matter how well the fallow has been worked, the most troublesome plant being Cape weed or dandelion. There are other weeds such as mustard, wild oats and barley grass. If the land consists of a limestone soil or red, loamy, sandy soil it is quite safe to sow dry, so far as the setting of the soil is concerned; but if the farm consists of hard red clay land there is a danger of the earth setting down so firmly that when the wheat has germinated it cannot come through the soil. If rain continues to fall at intervals of a few days, the young plant will find its way through while the surface is soft, but if the land becomes hard after germination, the plant will turn back under the surface crust, go yellow and die. Where land settles down to such an extent, harrowing should be undertaken, but the harrows must be very sharp and perhaps weighted according to the thickness of the crust of the soil. Harrowing at this stage is very difficult in patchy land, because in places they go too deeply, in others not deeply enough. It is also necessary to consider whether there is sufficient moisture in the ground to start germination. If that is so, there is the risk of the wheat coming up in patches, and if no rain falls, a patchy crop will be the result. Then there is a risk of a fall of 20 to 30 points of rain, just enough to start germination, and if the weather then keeps dry for a week it results sometimes in the death of the young plants and makes it necessary to resow.

However, if one has suitable land make a start, because some very good crops have resulted from dry sowing.

DISCUSSION.

Mr. A. J. Todd stated that wheat on stubble ground or on sandy fallow should be sown in April, if sown later the ground became too cold for the wheat to make a rapid start. He also recommended fallowing sandy ground after harvest.

Mr. W. L. Brown recommended to sow in a dry season in the middle of April, but the best time to sow wheat by his experience was in May, and he had never known it to malt. Dry sown wheat came up with weeds and got ahead of them; if sown later and the weeds were big they killed the wheat.

Mr. F. W. Jericho stated that last year his late sown wheat was the best and the early sown was practically a failure. It would have been better to have waited and sown later.

Mr. K. Gillen advised early sowing if a dry summer was experienced, as early rains were sure to follow, thus bringing up the weeds on the fallow, which would allow farmers to make an early start.

Mr. A. Spriggs stated that seeding operations should commence according to the season. This year early rains had fallen and practically all the weeds had germinated. Stubble ground was ready for seeding to commence, but on no account should seeding be started until the bulk of the weeds were up.

Mr. H. W. Zinkler was in favor of sowing early, especially this year since early rains had fallen, so that the wheat would be advanced if a dry spell came in September.

Pasture Plots at Murraminga.

[J. S. HUNT (Murraminga).]

The value of good pastures is not yet fully realised in this district, but to-day much more interest is being paid to the improvement of grass lands. Density is judged by the amount of bare land that can be seen when walking over the pastures, because if the area is sown down, it is expected that the land will be covered with a dense growth of suitable plants. The more plants that can be made to grow the more stock that can be carried. Evenness is maintained by grazing with sufficient animals so that growth is eaten off regularly. Large fields are often grazed by so few stock that they only eat in patches, and much of the area is left to grow rank and is more or less wasted. In spring some of the grazing area should be shut up for feeding later in the year.

Keeping pastures free from weeds and useless plants is largely management. See that only clean seed is used for all pastures sown; careful grazing will also help. An area which is subdivided into two or more paddocks will carry more stock and carry them better than if they are allowed to graze it as one large field. The size of the field will vary within certain limits according to soil, climate and method of management. The object of subdivision is to allow the fields to be grazed quickly and to be spelled at certain times of the year. Fencing and watering are expensive, therefore this work will have to be done gradually, just as funds are available.

The Murraminga Plots.

The following seeds were planted:—King Island Melilot, Burr Clover, Lucerne and Wimmera Rye Grass; 2½ acre plots were put in of each with 2½cwt. 45 per cent. super. With the poor rainfall of only 110 points from July to November, Burr Clover and Melilot were a failure. Wimmera Rye and Lucerne came on splendidly, and after 280 points in December, Lucerne made wonderful growth. In February, 1938, 465 points were recorded in 3 days. The Lucerne looks wonderful. Wimmera Rye Grass and Lucerne would appear to do well in our sandy soil, but it must not be grazed too heavily until it becomes established, also it would be more profitable in the long run on light country to concentrate on a small area with rye grass and Lucerne with increased supering—at least 3 to 4 cwts. annually.

Masonry on the Farm.

[R. Ackland (Chapman Bore).]

When considering the erection of buildings in a limestone district such as this, one's natural desire is to erect masonry walls.

Owing to so much pioneering work requiring to be done masonry buildings are seldom erected; but once the farm is fairly well established an effort should be made to build all buildings with masonry walls. Ample supplies of stone can be found lying around in the paddocks, cropping up on the surface, or they may be dug readily from the soil. These are usually bad bedding stones, that is, stones which would not lie readily at rest when placed upon each other. When thin flat stones are connected together with strong sound mortar, placed in a thinnish condition between them, a good strong, lasting, economically constructed wall can be obtained. Walls built of stones picked from paddocks and used in a natural condition are known as rubble walls. Owing to the irregular shape of paddock stones the walls have to be made considerably thicker than walls of the same height in brick.

Once the dimensions of the building are decided upon, the position of the walls is set out, all foreign matter is cleared away and stumps removed. Holes made by stumps should be filled up solidly. Stone footings should be built of large flat stones 9in. to 1ft. wider than the wall intended to be erected on it, and not less than 9in. thick. Bring all footings to a true level. Use large flat stones in footings to give good bearings for the walls. Then place a damp course over the full width of the walls. This damp course can be made of heated tar and sand, preferably dry sand, well mixed with a mortar hook, and made one inch thick and patted down. A considerable amount of skill is required to keep the walls plumb, with random stones for quoins, but with a little time and patience this can be done. Nevertheless, the use of bricks for corners and around all openings pays handsomely, as much time is saved and the appearance is greatly improved. Place the largest stones at the bottom of the wall for a good bearing. Care should always be taken in the bonding; breaking the joint is the essential feature of bond, that is, placing a stone where the ends of two stones meet. Headers or what are more commonly known as "through stones" extend through the entire thickness of walls to tie them. These are objectionable as damp is more likely to show on the interior walls where the continuity of the material is uninterrupted. The heart of the wall should be made up of spalls, sometimes called "shivers." These are the broken chips of stones and when walls are brought up to a level a grout should be poured over the stones to fill up any crevices between the stones. When pointing walls all mortar droppings should be brushed off, walls wetted and fat pointing mortar used. Do not let the pointing dry out too quickly; keep wetting it if drying out. All stone-work under damp-course should be pointed with cement mortar, as lime mortar is liable to fret away.

Concrete Fencing Posts.

[W. J. Greig (Beetaloo Valley).]

Concrete is a product resulting from the proper mixture of cement, sand, and stone or gravel and water. The cement acts as a mineral glue binding these materials firmly together. Many people believe that the quality of the concrete depends entirely upon the cement used. It is true that a high-grade cement must be used, but of equal importance is the selection of the other materials and the care exercised in their mixing. Good concrete can be made by following these five simple rules:—(1)

Use good clean sand; (2) use clean, well-graded stone; (3) mix properly and completely, four times dry and three times wet; (4) place carefully; (5) use care while curing.

Where concrete is to be mixed by hand a watertight platform should be made; it saves waste and keeps all materials clean. Measure sufficient sand for one batch and spread the cement as evenly as possible over it; then measure the desired amount of stone and spread over the other two. Mix all the materials thoroughly by turning several times with a shovel until all streaks of brown and grey disappear and the colour is uniform. Make a hollow in the centre of the heap and add water, mixing until the desired consistency is obtained. Avoid using too much water in mixing; excess water weakens concrete. The concrete should always be wet enough to bring water to the surface with moderate spading. Always remember that the more one works concrete the stronger the finished article becomes. The materials are mixed in the proportion of 3: 3 and 1 of sand, stone (½in. to 1in.), and cement.

CONCRETE POSTS.

Concrete posts will be the coming article for fencing, as timber is becoming scarcer, and posts, if obtainable, are small and cut out of young trees, which will not last any length of time. The price for concrete posts is no greater than for the split posts, and the former will last a lifetime. We have posts of all sizes, ranging from the ordinary post to strainers and uprights for sheds to a length of 14ft. and 5in. x 5in. square. A suitable mould must be made for these posts—¾in. flooring board is about the right thing. The mould can be made any size from two posts onwards. The two-post moulds are preferable, as they can be pulled apart more easily. The mould must be made on tapered lines, *i.e.*, when the post is made it will be 6in. x 4in. at bottom and 4½in. x 4in. at the top. Holes can be bored in the mould through which iron pins of 7-16in. or ½in. diameter are placed for wire holes, according to the gauge required. The post must be reinforced with iron bars of 5-16in., or heavy gauge wire such as No. 6. The length of the post is about 5ft. 6in. First place the mould on a smooth boarded floor lined with tin. The sides should be well greased with old sump oil to prevent the concrete from sticking to the mould. Place about 1in. of the mixture in the bottom, well tapped with a trowel, then place four of the bars or wires on top with the ends bent round in the shape of a large hook. Place well-oiled pins through these holes and fill the mould with concrete to about 1in. from the top. Place remainder of bars in the mould and fill to the top with concrete, well trowelled to bring water to the top. Give the sides of the mould a slight tap with a hammer to give the sides of the post a smooth finish. The bars or wires must be about 1in. in from the sides. Leave the posts in the moulds about two days before removing them.

Pigs on the Farm.

[E. STEPHENS (Beetaloo Valley).]

On most farms one or more pigs are kept mainly for the using up of waste matter from the house and unsaleable grain from the harvest, such as screenings, &c. One should study the type of pig kept for this purpose, as the days of the heavy type of pig have gone, and the best breeds and crosses in use these days are as follows:—Berkshire-Tamworth cross, Mid York-Gloucester, Old Spot-Tamworth, Duroc-Jersey, and others of the same type, which, when crossed with the Large White boar, produce the desirable type for the present-day market. These should have a nice white skin, being long and deep, with very little waste fat. The old heavy Berkshire type of pig has too much waste on it, and buyers are not prepared to pay top market price for them. This should be the first point studied in the purchase of a pig, as the correct type means the top price for the finished baconer.

HOUSING.

Yards should be situated away from all outbuildings on the farm, with at least three sides open to the wind. Wherever possible, the ground should possess a good slope, and a good shelter shed of some description should be erected in the centre of the yard, such as a good long straw stack running north and south. The pigs will very soon dig in the side of the stack a shelter, which will be clean, dry and warm. The framework of a shed could be erected with a straw roof built over it. This makes a very desirable type of yard, being both cheap and effective, and suits the average farmer who keeps only a few pigs. Of course, the man who keeps a lot of pigs must make more elaborate preparations, as pigs are subject to many complaints, and once these commence in a piggery they are very hard to arrest, and generally very heavy losses occur. Therefore, the second point is good, clean, warm housing, with well-drained yards. It is important that pigs should have plenty of exercise, particularly while they are young; it assists in keeping them strong and in good health.

Feeding.

Whether it be waste matter from the house or unsaleable grain, it should be fed in moderation, as a pig is likely to gorge himself and become over-fat. When he reaches the required size, if fed generously, he will be found to carry too much fat, and this is both a waste of feed and labour. This should be avoided where possible, and if more than one or two pigs are kept they should be put in yards according to their size, so that all pigs receive a fair share of the food fed to them, resulting in all pigs finishing evenly, and being ready for market at about the same time.

A good guide to the condition of pigs can be gained by closing the hand and pressing the knuckles into the back. One should be able to faintly feel the backbone of a pig that is not over-fat. If the backbone cannot be felt the pig is too fat, and his food should be reduced accordingly. This method should be applied to pigs from time to time to gain an idea of their condition.

Pigs, when fed properly, should be in good marketable order at from 6 to 8 months of age, and providing they are from a good growing strain, will seldom take longer, thereby showing a good profit for very little time, labour and outlay.

In conclusion, there are three main points connected with pig raising. First, one must secure the right type of pig; secondly, housing accommodation must be warm, clean, and well drained; thirdly, feeding should be regulated according to the growth.

Breaking and Handling Young Horses.

[A. G. Bartrum (Beetaloo Valley).]

With the advent of motor cars and tractors the rising generation will be remarkably ignorant of the breaking, training and handling of horses. It is doubtful if the place the horse has so honestly filled on the farm in the past will ever be taken entirely by mechanical power.

The farm team of horses, by reason of the fact that its units can be used together or separately for many types of work, has advantages which are not available with the tractor. Even where tractors are used in preference to regular plough teams, it will always be necessary to keep one or more horses of the draught type to do the odd jobs. If this is correct it should still be an important part of the training of every farm hand and would-be farmer to learn not only how to work harness, groom, feed and work the well-broken farm horse or team, but also how to handle, break to work and train young draught horses.

The usual course pursued to-day is to send any young horse which may have been bred on the farm to a professional horse-breaker who often returns a broken-spirited, sullen brute, ready to kick, bolt or jib when opportunity offers. But even the best men who break horses for a fee have less interest in the outcome than the man who is going to work them day after day on the farm.

Horse-breaking mainly requires patience, kindness, common sense and a knowledge of the work the horse will be called on to do. No animal, unless it be a dog, is more sensitive to the emotions of its trainer and master than is the horse, and for this reason it is essential for the man who proposes to break in his own animal to take the greatest care that under no circumstances does he lose his temper, become flurried or act hastily.

If the young horse has never been handled or taught to lead, the first thing is to get him into a strong yard, from which he cannot escape by jumping and cannot damage himself on wire. A quiet old horse is the best decoy with which to yard the youngster, and the less fuss and noise employed in getting them into the yard the better. The old horse should be removed, and then with a light stick 6 or 7ft. long first of all walk quietly about the yard until the colt becomes used to you. Stop any rushes which the youngster may attempt by holding out the stick, or if necessary rap him on the nose with it. When he has quietened down approach his head gently, holding out the stick towards him. Talk to him all the time, and on no account take your eyes off his, for this is a great factor in inspiring confidence in the animal. If at this stage the colt breaks away before you can rub him with the stick, give him a light rap on the nose as he makes the break, and use every endeavour to have him always facing you. Once you have got the stick on the horse, rub it down the neck and shoulder, all the while approaching his head until you are standing close beside him. A much quicker method is to use a good crush-pen for getting the halter on.

From now on leave a head-stall on the horse and feed him well when the day's handling has finished. When you approach him next morning you will find he has lost most of his fear of your handling.

The business for the second day is to teach the horse to lead. If he does not follow you easily with the halter only, pass a long light rope through the bit ring on the head-stall, round under his tail, and back through the bit ring on the other side. Connect the ropes over his back with a loose loop of cord to prevent them from dangling down his sides, or better still, pass them through the rings of a surcingle. A slight pull on the rope or on one end of it will make the horse follow you anywhere, and at the same time it will make him used to the feel of a crupper. When he is thoroughly easy to lead, put a heavy bit in his mouth and tie this back lightly and evenly to the rope which passes around and under his tail just tightly enough to make him feel the bit, and be sure that the pull on each side of the bit is even.

When the colt is used to the restraining influence of the bit, take him out into a paddock and run him round for an hour or so, first with the rope on one side and then on the other; then with both reins, collar and hames, saddle and breechings. When the youngster is quite happy in this and answers well to the reins and words of command, he can be hitched to a swingletree, which is securely attached to a light log. An hour or two in this will teach him the feel of the collar and harness and will give him the idea of pulling. It does not matter how much he becomes tangled up; the more he does the better horse he will be when placed in the team.

Farm Buildings.

[L. Ames (South Kilkerran).]

The first problem that confronts the selector is the most suitable site on which to establish the homestead, which should be in such a position to avoid as much as possible any waste of time in unnecessary travelling. Having selected the site in an elevated position, the various buildings should be set out to form a compact symmetrical layout.

Of necessity, the house would be the first building undertaken and should be designed to embody the maximum of comfort for the minimum of outlay. Grave mistakes are often made in this direction; help in planning of this kind is mostly available at no cost from others with more experience, or even from experts. In the construction of the home the serious mistake of using cheap or inferior material is often made. This is false economy, both as to material and workmanship, as these defects will always make their presence known in time to come. Often a complete house is not erected at the beginning, but that does not prevent the preparation of a complete plan, thus making future addition much easier without undue waste of the work expended in that which has already been erected.

The greatest attention should be given to the domestic workshop (the kitchen), where labour-saving devices will be as much appreciated by the housewife as are similar devices by the men in the field.

Outbuildings.

In the construction of outbuildings careful planning is essential, and such things as drainage, relative position to the house, and general accessibility should be taken into consideration, and in no case should two buildings used for widely different purposes be adjoining. General overcrowding of buildings should be avoided throughout as a safeguard against fire.

Hints on Teamwork.

[E. G. Jericho (Pinbong).]

To get the best from a team of horses they should be worked abreast. If equalisers are used for a tandem team the best horses could be worked in the lead, because they are further away from the work and consequently have to do more work. It is always necessary to make the slow horse do his share. A coupling between a fast and slow horse would only need to be about 12in. long; in other cases, about as long again. If they are working evenly no sore shoulders should be found, unless the draught is too heavy for them. When a horse has sore shoulders a bag folded double under the collar with a piece cut out over the sore may heal it again while the animal is working. Powdered blacklead and olive oil seems to be the best mixture for keeping a collar smooth. At times it may be necessary to wash the sore with warm water and soap. To feed horses with long hay one should have a wide feeder, or one that is fairly high along one side, so that horses cannot reach over. When horses become weary they should be given a little grain—a kerosene tin of oats for four horses per feed or less will liven them up a lot. If the hoof is cut back to the frog a horse will rarely become tender on a farm. If the hoof breaks away too far the horse should be shod at once before working him lame. Swings should be 2ft. 11in. wide, and two-horse swings 2ft. 9in. to give a horse comfort.

Fertilisers and their Functions.

[E. M. Borlase (Charra).]

Plants, like animals, cannot grow and give best results on one kind of food alone. The main plant foods are nitrogen, potash, and phosphoric acid. Nitrogen can be purchased in different forms. Nitrate of soda and sulphate of ammonia are the most common, both being very expensive. There is, however, in the air an abundance of nitrogen which by proper cultivation is made available for the growing crops.

Our main crops, wheat and oats, are not heavy feeders on potash, most of which returns to the soil with the decay of the stubble. While our crops are carrying that deep green colour in the growing period, we need have no fear of there being a cause to supply potash as a plant food. Phosphoric acid is purchased by us in the form of superphosphate, but there is another phosphate manure known as basic slag. This being a by-product in the manufacture of steel; there may be some available in our own State when the furnaces are working at Whyalla. Basic slag is very suitable for topdressing of pastures, and stock do well where this manure has been used. Our soils being very deficient in phosphoric acid, it is important that we supply our crops with this kind of plant food.

As we watch crops growing we notice that anywhere we have burnt trees or bushes the year previous the plants make rapid growth. The burning has encouraged the nitrogen-fixing bacteria, and they have made available an abundant supply of nitrates to the plants out of proportion to the other plant foods, with the result that in the later stages these places are the first to burn if early hot winds are experienced or to go down after good supplies of rain.

Phosphoric acid or superphosphate will not burn the crop, but has a tendency to strengthen the straw, thereby lessening the danger of lying crops, to promote healthier growth, help to withstand drought, encourage early maturity, and to fill the heads with sound grain.

Preparing for Seeding.

[G. H. Sutherland (Coonalpyn).]

Wheat should be grown on fallow, and fallowing should be done as soon as seeding is finished to give it the benefit of the spring rains when the land can be worked over to kill any weed growth, then again in the early autumn whenever a rain occurs, and then it should be sown, say, in May about a week after a good rain. A week will give the weeds a chance to have started, and sowing with a combine should make a good job. For new ground start immediately after the rain, or, if desired, the new ground could be sown dry. I prefer to sow new ground early and dry. Preparing for oats on fallow would be the same as for wheat, but if stubble or grass land is to be put in, the stubble or grass should, if possible, be burnt and the land ploughed or worked up early in the year, to let the soil sweeten up by the action of sun, &c. Sowing should be done after rain has fallen and the resultant crop of weeds has been killed.

Before starting to prepare land, make sure that implements are in order and capable of doing the job you expect them to do. It is wasting time and money to go out to the paddock with twisted ploughs or tynes; they will not cut the ground properly nor kill the weeds, with the result that harvest returns are disappointing. It is most important to have seed prepared properly. See to it that wheat has been graded and pickled. I prefer to use the grader and pickler; firstly, because one can do two operations in one, and, secondly, because it removes a lot of small, cracked and useless grains from the seed, which is useful for fowl feed, and if not graded this goes to waste; thirdly, because it is not so laborious and can be done at any time. Oats and barley should be run through a harvester to make sure that they are not "taily" and will run evenly through the drill. Regarding pickle for barley, last season I used "Ceresan" (a dry pickle) and found it quite satisfactory.

Care of Horses' Feet.

[L. Williams (Glencoe).]

In these days when the motor and tractor are gradully pushing the horse into the background on many farms, horses are being neglected more and more; particularly is this noticeable in regard to the care of horses' feet. In the days when a fair percentage of the horses on the farm were shod occasionally, if not regularly, the horses' feet were kept in a reasonably good condition, but to-day when shoeing is the exception and not the rule, horses' feet are allowed to grow wild, when with a little care they could be kept in a reasonably good condition, which would mean more comfort for the horse and would keep them in better condition. Nothing will keep a horse low in condition more than working with sore feet. On most farms where a fair percentage of the horses used are bred on the property, there should be very little trouble in keeping their feet in good condition. The first part of their education is to teach horses to be tied up and handled and to have their feet picked up. The best way to do this is to start when they are young—the younger the better, because the younger they are the easier it will be to hold them when one goes to pick up their feet. Where it is difficult to hold a horse, tie up the foot and keep it up until the particular job one wishes to do has been completed. Do not let the horse take its foot away, if possible; if it does, one will have much more trouble when next the foot is picked up. The only tools necessary to keep horses' feet in order are a rasp, a knife, and a pair of hoof-cutters. Keep these tools solely for this purpose; do not use them for any odd jobs about the farm, such as using the rasp for filing down pieces of old iron, or the hoof-cutters as pincers for pulling out nails, or they will not be much use to trim up the horses' feet again. In trimming a horse's feet try to get as level a bearing surface on the ground as possible, using the hoof cutters on any long crust. Then use the rasp to level it down, working from the heel to the toe; never across the foot, which would not give a level surface. When the hoof is level and short enough, rasp around the short, outer edge, leaving the edge with a rounded appearance, so that when the horse is walking the edge of the foot will not catch on stones or sticks and so break out in pieces. Leave alone the sole of the foot and the frog as much as possible; do not pare them down. Keep the knife for scraping out the sole and trimming off any scraggy pieces. On no account cut out the base of the foot. If that is done it will give the horse what is known as "contracted heels," *i.e.*, the heels close in and squeeze on to the frog at the back, causing the horse to go lame. One of the many causes of lameness in farm horses arises from cracks (some call them Sand Cracks), which are due to the feet being allowed to become too long, and when the horse treads on a stone or an uneven surface a split develops in the crust of the foot, sometimes extending as far as the hair. This becomes very sore and causes lameness, which could have been avoided by keeping the feet properly trimmed; and which can be very easily cured in the same way.

Advantages of the Agricultural Bureau.

[R. T. Laslett (Allandale East).]

The primary object of the early Bureau was to collect and publish, by means of the press, information of every kind calculated to prove beneficial to the colonists engaged in agricultural, horticultural, pastoral, and other pursuits connected with the cultivation of the soil. This is still the main object of the Advisory Board of Agriculture, which controls the many branches of the Agricultural Bureau throughout the State. The Department of Agriculture is thus able to keep in touch with every centre where there is a branch of the Agricultural Bureau, which makes it easier for the department to do its work, and through having these organised outposts in the rural districts the work of the department is much more effective. The Department of Agriculture has officers possessing special technical knowledge of certain branches of agriculture, and these are stationed in the various districts of the State, besides experimental farms and orchards and similar institutions for research and investigation. These are advantages that the early Bureau did not possess. Another advantage the Bureau now has is that of the *Journal of Agriculture*, a publication of about 100 pages issued monthly. It is the medium by which the department gives publicity to the work done by its various branches, and is the official organ of the Agricultural Bureau, thus the Bureau does not now solely depend on the press for publication of material affecting members.

At the meetings of the local branches members not only hear papers by their own members, but they also benefit by hearing lectures and addresses on agricultural subjects by men who have made a thorough study of their work, and who are ready at all times to assist the man on the land. It is an old saying that we learn by our mistakes, but if through hearing someone more experienced we may avoid these mistakes, it is surely more economical and beneficial.

Another very real advantage of the Agricultural Bureau is that in the case of stock ailments and diseases advice is readily given by veterinary officers of the stock department. The identification of plants by departmental officers has proved of great benefit to many districts where dangerous weeds have sometimes been checked and destroyed before they had a chance to spread. At district conferences which are held at various centres throughout the State, and at the annual congress in Adelaide, representatives of bureaus have an opportunity of hearing officers of the department speak on selected subjects. Resolutions which had their origin in the small local branches may be brought per medium of the annual congress before the proper authorities, and vital matters affecting the whole State discussed. Members thus have a powerful agent in the Advisory Board working in their interests Papers given by members of one branch are not only intended for the benefit of that branch only, but they may, per medium of the *Journal*, assist primary producers in others parts perhaps hundreds of miles away.

The cost to become a member of the Bureau is very small, the subscription being two shillings per household, plus a branch subscription of a like amount or even less. Apart from the social aspect, the effect of a few members meeting monthly to discuss their problems and striving to find a solution for them, must surely have an educational value. Let us, then, as members, strive to do our part to ensure the smooth working of the branch by being punctual and exhibiting a keenness in the discussions brought forward, by contributing to the agenda when our turn comes, by enlisting and encouraging new members, and thus ensuring to the coming generation the value of the Agricultural Bureau.

Tandem v. Abreast Teams.

[H. Grocke (Waddikee Rock).]

In the course of his paper Mr. Grocke stated that after experience with both types of team he had come to the conclusion that the tandem team was preferable where 8-14 horses were used, while teams of 7-2 horses were best worked abreast. The tandem team could pull a heavier load because the horses were pulling directly in front of the implement; whereas with an abreast team the rein horses were pulling at an angle, and could not exert so much pull, as they were using most of their strength to keep in position. A tandem team would cover more ground in 12 months; every horse pulled equally, thus making it easier for all the team. In a team worked abreast a slow horse could rest his swing on the swing behind his own, leaving the next horse to do his share. The quantity of heavy wooden swings used with an abreast team was very awkward in stumpy country; swings were often broken and time lost in replacing them. A tandem team could work closer to an implement, which meant easier pulling. The leaders of a tandem team were only a neck ahead of the horses in an abreast team, although there was sufficient and comfortable space for the horses in the rear. The horses of an abreast team suffered a good deal with sore hoofs, because in turning they could only shuffle around and would step on one another. Tandem horses could turn and walk without knocking each other, and they did not become so tired. The farmer with an abreast team lost an acre or two in the first round of a paddock, since he could not work the implement as close to the fence as could be done with a tandem team. The results from a team of horses depended very much upon the driver.

What do We Owe to the Agricultural Bureau?

[E. F. Boehm (Sutherlands).]

Before a satisfactory answer can be given to the question of what we owe to the Agricultural Bureau it is necessary that one should be quite clear as to the part this organisation fills in South Australia and what its objects are. The Bureau provides the point of contact between the man on the land and the expert and advisory officers of the Department of Argiculture. It endeavours to bring agriculturists together to discuss their problems and experiences in an orderly and thorough manner, and as a body it provides the department with an organised local centre for extension and propaganda work and the collection of data on local agricultural matters. Only through the Bureau is it possible to effectively disseminate the knowledge gained through experimental work and scientific research. Newspapers and circulars could never perform the service that the technical officers and advisory officers of the research institutions and of the Department of Agriculture render for the advancement of agriculture in this State through the medium of the branches of the Bureau. Besides, the study of literature alone is rather a selfish way of increasing one's knowledge and efficiency. It is taking advantage of what someone else offers in a spirit of helpfulness, and it gives nothing in return. As an active member of the local branch of the Bureau the agriculturist contributes to the pooling of knowledge for the benefit of all. There is no better way of raising the efficiency of the agriculturists of the State than by inducing them to be active members of this organisation.

Nowadays agriculture is ever becoming more complicated. The efforts to force down the costs of production have called for more technical knowledge. A tremendous amount of scientific research is being carried out by various research institutions, and a large amount of experimental work is being done in an effort to apply the results of research to a large variety of conditions of soil and climate. Unfortunately, however, a large number of the population, especially the rural population, still remain indifferent to the conclusions of these investigations, and contend that personal experience and family tradition are the best guides. This attitude arises from ignorance of the true function and objects of scientific research in agriculture. It is best described as blind prejudice.

One of the functions of the Bureau is to convince members and others that the application of science to agriculture is the endeavour of gifted and specially trained men to discover the causes and nature of the phenomena constituting to the problems.

of primary production, with the object of ultimately increasing the efficiency and prosperity of the producer. Some of these problems involve soil chemistry, agricultural chemistry, plant physiology, plant and animal pathology, genetics, animal nutrition, and the life histories and control of pests.

In connection with any of these problems the man on the land can obtain helpful information and advice from experts through the medium of the Bureau, and for this reason the organisation is of great value to the State.

Agriculture as practised by the average man on the land is more an art than a science, yet the need for research and field experiments should be obvious to every intelligent layman when the limitations of the untrained, non-technical mind without the assistance of expensive and necessary scientific equipment are considered. Much of the expense of research work is being paid for by the agriculturists of the country as taxpayers, and therefore they are entitled to benefit from the facts established by such research. The wider realisation of the need for scientific research in agriculture and of the importance of disseminating the knowledge gained as a result of research work in a readily assimilated form would be followed by a better appreciation of the privileges of membership of a branch of the Bureau. It is only when we understand the true nature of the part which the Agricultural Bureau fills in the agricultural and economic life of the State that we can properly understand what we owe to the organisation. But unless we are prepared to deny that our own welfare is bound up with the welfare of the whole State and nation, and that the promotion of the well-being and advancement of agricultural, pastoral, horticultural and kindred industries, and, therefore, of South Australia, is in our interests, we must admit that we owe it to ourselves and to our State to support the Bureau to the best of our ability.

At the Robe Conference. Messrs. S. Shepherd and S. Williams, of the Advisory Board of Agriculture, and Officials of the Robe Branch.

In order to do this we owe it to the Bureau to (1) attend meetings regularly and punctually, even at some personal inconvenience; (2) do all we can to promote discussion and debate on the subjects considered at meetings; (3) assist Branch officers and fellow members in every possible way to ensure smooth working of the Branch and to foster a spirit of unity; (4) make suggestions for rendering meetings more interesting and instructive, and do our part to carry out such suggestions if adopted by the Branch; (5) endeavour in all things to set an example of what we think an active member should be; (6) try to win new members and thereby strengthen the Branch and extend its sphere of influence.

First Aid Demonstration at Lobethal.

The April meeting of the Lobethal Branch was in the hands of the Lobethal Division of the St. John Ambulance Brigade. Ambulace Officer Bruggemann gave a general outline of the foundations and principles of the Association, and Sergeant Reuter dealt with fractures, including causes, types, symptoms and treatment. This was followed by a practical demonstration in which members of the Brigade took part. Officer Bruggemann then spoke of circulation of the blood, dealing with the pressure points at which arterial bleeding may be arrested. A tourniquet was explained and its use demonstrated. Sergeant Reuter gave information on the treatment of home accidents. Members showed their interest in the demonstration by asking the officers numerous questions.

Experiments in Bleaching Wheat.

[J. A. Atkinson (Nantawarra).]

In a paper dealing with his experiments in bleaching wheat in order to ascertain whether wheat loses weight by so doing, Mr. Atkinson stated: The method used for bleaching was by soaking a tin of unbleached Ranee wheat weighing 3lbs. 15ozs. in water for 24 hours, which left the grain very large, swollen and soft.

The method used for drying was to spread a bag upon a flat iron roof and scatter the swollen grain upon it, leaving it there for 12 hours on a very hot day, being satisfied that the grain was thoroughly dry. The tin came into commission again, being filled with the bleached grain, and weighed 3½lb., leaving 7ozs. of grain over the tinfull. It is surprising that this 7ozs. represented a double-handful of grain.

It is interesting to note with satisfaction that the farmer does not lose anything as far as weight is concerned by having his crop bleached with rain.

But there are many other disquieting factors which affect the farmer, some of which I will endeavour to enumerate.

It is not surprising that the farmer cannot get 180lbs. in a bag. This bleaching experiment shows that wheat swells one-eighth of its normal size, and a bag of wheat would be 20lbs. lighter than would be the case if it were unbleached. Other difficulties encountered are getting the wheat standard weight. The extra expenditure to a farmer who produces 2,000 bags would be (for bags sewing, cartage, and twine) £12 13s.

This experiment is trifling compared with reports that have been sent overseas to importing countries about Australian damaged grain. Australian wheat has always been equivalent to Manitoba No. 3, and on account of these exaggerated damaging reports our wheat has been sold for one shilling per bushel less and is to-day the lowest quoted wheat in the world. Notwithstanding all these reports our bleached grain has been milled and proven to be satisfactory in all departments.

With our present system of marketing these factors tend to disturb the smooth running of world markets which have been responsible indirectly for reducing the price of wheat, without exaggeration, another 1s. per bushel. Wheat merchants cannot buy a cargo of wheat unless they sell it the moment they purchase it. Thus if farmers choose to sell, say one third of their wheat to meet immediate commitments, merchants claim they have overbought and cannot find sales, so they drop the price substantially and insert in the press some anecdote about good rains in Argentine or some other wheat-growing country. These reports, with the big drop in prices, scare the farmer so that he rushes in and sells more at the reduced price, and consequently merchants in their turn are scared; and thus the circle goes on until markets for wheat fall below the cost of production and farmers go cap in hand and under great humiliation to the Government for assistance in the form of a wheat bounty.

The majority of thinking farmers consider on principle that bounties are all wrong, and would not take it if circumstances did not compel them.

So much for complaint; let us offer some solution of this problem. The Agricultural Bureau has proven invaluable, if not indispensable, to the primary production of the State and I do not consider it outside the realm of their activities to supply us with independent private cables once a week of Dominion and overseas wheat markets. It is not reasonable to expect private trading individuals to at all times give us reports when at times it would be against their interest to do so.

Sheep Rugging and Rugs.

[H. HARTMANN (Monarto South).]

The practice of rugging sheep is quietly gaining ground in this State owing to favourable reports from owners in different districts that rugging has proved beneficial to sheep. It has been very difficult to obtain reliable figures and actual results from many of the growers experimenting in a small way.

Comparing actual improved values obtained per sheep as between rugged and unrugged sheep, rugged and unrugged wool was offered and sold during the wool-selling season 1936-37, for approximately 50 growers. For all these lots actual increased value per lb. for rugged wool was obtained when compared with unrugged wool grown under similar conditions. Every lot of rugged wool showed an increased value ranging from 1½d. to 6d. per lb., according to the class of country upon which the sheep had been grazed, best results in wool value naturally being obtained from the light rainfall country where there was soil erosion and where the fleece of unrugged sheep had become loaded with earth, and from the agricultural areas of the State where sheep had been running on fallow land.

From 18 growers actual returns of wool weight cut per sheep were obtained, the increased weight from rugged sheep ranging from 1½lbs. to 2½lbs. The results where actual figures were obtained show increased values from 1s. 11½d. to 6s. 9d. gross per head for wool in favour of the rugged sheep. From these results, and from the balance of the 50 lots on which wool values only were worked out, and giving even weights per head for rugged and unrugged sheep, the average return from all experiments reviewed showed 4d. 6d. per head gross improvement. The average cost of the rug was 1s. 9d. each, plus allowance made for attention during the period of rugging, 6d. per head, total average cost 2s. 3d., average return 4s. 6d., or 100 per cent. on outlay per head.

Practically all growers advise that rugging definitely improves the condition of the sheep. No scientific data has been obtained regarding the feed value, but from observations and from the results obtained by many sheep owners who have rugged sheep for fattening purposes, the results are so good, and, in some cases remarkable, that rugging appears to be of a greater value from the point of view of the health and condition of the sheep under any grazing conditions than for wool improvement.

A few growers have reported failure of any good results through rugging, the chief causes of failure being the purchase of rugs made from inferior material, such as calico or light-weight duck or wheat sacks; failure from inferior jute fastenings being used even when the rug was made of good material; failure to tighten up the fastenings on the rugs when sheep were rugged in the initial stage; failure to adjust the fastenings of rugs, causing excessive tightness and splitting of the rugs; and the failure to take the rug off the sheep after a desirable period for wool improvement (over-rugging brings up excessive yolk, causing discolouration, poor, clean yield, and a low-wool price); failure from rugging sheep in scrub country; failure to show any marked improvement either in wool or condition in country where the climate is mild and the feed good.

At Roseworthy Government Agricultural College, where sheep were exceptionally well fed and given supplementary feed in late summer and early autumn and where the climate is mild, only 1s. 11½d. gross increased value per head was obtained for wool value. Rugs cost 2s. each. No data was kept regarding condition improvement.

Period of Rugging.—For best results in wool improvement it is recommended that sheep in the light rainfall areas and where the summer is dry and hot be rugged through the summer only—say, for five months from late October or early November until late March or early April. Only one or two adjustments of the rug fasteners are necessary during this period.

For protection against excessive cold and wet weather it is recommended that sheep be rugged for five months, from, say, the middle of April to the middle of August. Wonderful improvement is shown in the condition of lambing ewes and weaners if rugged during the cold weather. Again, during this period about two adjustments only would be necessary.

Wool Improvement.—There is no doubt about the superiority of rugged wool. It has been definitely proved that the rug is a shade during hot weather, and not an encumbrance to the sheep or detrimental to the health of the animal. Rugged sheep are out feeding when unrugged seek shelter. On rugged sheep the wool, being sheltered from the heat and dust, does not bleach or perish. The protection allows the growth of a live, well-nourished fibre and a more solid and healthy staple which shows more character.

After rugging for approximately five months, as recommended, the rug should be removed. The well-formed tip and live, rugged growth of staple is then, in itself, a protection for the undergrowth. Improved growth of staple and heavier cut per head is shown if sheep are rugged in the cold and good rainfall country during the autumn and winter months. Again, the period of rugging recommended is five months from April to August.

Condition Improvement.—Under almost any grazing conditions, other than drought, sheep will show improvement in condition when rugged. Sheep fatten more quickly and hold condition better, and more sheep can be fattened on a quantity of food. Weaners improve in growth and condition if rugged during the autumn and early winter months. Lambing ewes show improved conditions and make more milk for the lambs. Lambs raised on rugged mothers are definitely better in growth and condition. Old ewes have been fattened off more readily for market, and lambs which missed the market in the "sucker" stage have fattened under the rug during the summer and autumn months as weaners. Sales of rugged fat lambs and old ewes have proved most profitable to growers. Many lots are now seen at our Abattoirs market sale yards.

Rugging Stud Sheep.—This is an old practice. From observations, it is recommended that rugging can be used to great advantage if done judiciously. Ram lambs improve in size and condition if rugged in the weaner stage. With grown sheep best results are shown if the rug is used, say, for a few months after shearing. It is important, however, that the tip of the wool be allowed to get its natural colour before rugging. Rugs can again be used through any cold spell. Rugging is preferable to housing, because it allows the sheep to get more exercise. Over-rugging well-fed stud sheep should be avoided, as it tends to make the wool over-ripe.

Fly Strike.—In all reports on rugging indications are that a smaller percentage of rugged sheep have been struck. No reason can be given, other than that rugged sheep are healthier. An experiment with fly specific dressed rugs is being carried out in New South Wales. Twelve fly specific dressed rugs were tried out here, and none of the sheep wearing these rugs were struck during the rugging period of five months. It is safe to say that rugging will not increase fly trouble.

Rugging will be best suited for the sheep owner who carries up to 5,000 sheep. The advantage as shown to date encourages one to believe that the careful man who is good with sheep husbandry can very profitably use rugging. During the current season many lots of rugged wool have been sold, the average prices above unrugged being approximately 3d. per lb.

The Rug.—The practice of rugging has had hard setbacks, chiefly through the inferiority of the class of rug used, and the erroneous idea that a sheep must be rugged for a twelve months' period. There are now several good classes of rugs on the market, which, if used over the period of rugging recommended, will last for two or three seasons. Up to date it has been the endeavour of those advocating rugging to keep the initial cost of the rug low and attractive. Successful rugging enthusiasts are now recommending that a better class of rug be used, giving a life of several seasons' use.

The jute canvas rugs undressed have in most cases given a two seasons' service when used per season for five months, thereby reducing the cost 50 per cent. per season. The jute canvas dressed rug is proving even more durable, and a number of sheep growers using them report a two seasons' service, with a likelihood of a third. The life of the rug depends a good deal on the class of country on which the sheep are grazing.

Cotton rope ties have been proved the most reliable. These ropes, however, want renewing if rugs are to be used for two seasons. Some growers prefer to replace ropes with different lengths when making rug adjustments, using the short and long lengths as required during the life of the rug. The jute canvas dressed rug is the best rug so far produced here for the money, and at the moment its use is recommended.

Activities of Women's Branches

ALAWOONA.

Mrs. Wright presided at the April meeting. The following papers were read:—"Home Garden," Mrs. Koch, and "Music in the Home," Mrs. Balnaves. The Sponge Cake Competition was won by Mrs. Whitehead.

On 18th March members discussed "Washing Blankets." Savory Scones made with buttermilk as one of the ingredients were displayed, the best entry being that of Mrs. Wright. (Secretary, Mrs. W. Cooper.)

AUBURN.

Afternoon Tea Dainties.

On 25th March 15 members met at the residence of the Secretary (Miss L. Dennison). Mrs. Schmerl won first prize for a tray of Afternoon Tea Dainties. The Secretary gave the following recipes:—So important a place do savouries now occupy in meal planning, that housewives who are most desirous of pleasing, are now making a study of them. Even the lightest and creamiest of cakes can not shake the popularity of savouries for afternoon or evening parties. Tempting savouries are greatly appreciated by the majority of people. Many people regard savouries as difficult to make, but this is not so.

For sandwiches, day old bread is best, either white or brown, cut very thin. Various savoury butters may be made, such as cream some butter and add a little salt, cayenne and a pinch of mustard, or add a little chopped parsley. A combination of fish, meat, eggs, cheese, marmite, pickles, lettuce, and tomatoes can be used, also raisins and nuts and a squeeze of lemon, some of these will always be found in the house.

Pastry cases or cream puff cases can be filled with any tasty savoury.

Cheese Straws.—3ozs. each of flour, butter and cheese, yolk of 1 egg, squeeze of lemon juice, a little cayenne, and a pinch of salt. Sift flour and add butter and grated cheese. Mix egg yolk and lemon juice, work all into a lump, then roll out and cut into biscuits and bake 5 to 10 minutes until a pale straw colour.

Bridge Kisses.—Sift 2 large cups of flour with 2 level tspns. baking powder, 1 saltspoon cayenne and ½ tspn. salt. Rub well in this ¼lb. butter and bind with 2 eggs and enough cold water to make a stiff dough. Knead well and roll out ⅛in. thick. Cut in rounds or squares and bake in a moderate oven until a nice brown. When cold spread with the following mixture and double:—Mix thoroughly 1 dstspn each butter, cream, cheese and marmite, 1 tspn. mustard.

Apricot Biscuits.—3ozs. each butter and sugar, 1 egg, 6ozs. flour, 1 tspn. apricot jam, 1 tbspn. cream. Mix ingredients well, then drop little lots on oven tray, put in a hot oven 5 minutes.

At the April meeting, which was attended by 22 members, Mesdames Boys and Stephens instructed members on "Colour Blending."

BALHANNAH.

Mrs. L. Hill spoke to members on her experiences in England at the March meeting. On April 20 a Scone Competition was held, prizes being awarded to Mesdames Wicks and Middleton. (Secretary, Mrs. W. Grow.)

BALUMBAH.

A Question Box afternoon was held at Mrs. Van Heythuysen's residence on 2nd March. At the April meeting Miss J. Aveling read a paper "Our Native Flora." Recipes for making quince jam were given by Mesdames Swann and Wohling, and two competitions were conducted by the secretary (Miss H. Jericho). Mr. H. D. Adams (District Agricultural Instructor) addressed the May meeting on his trip to England.

BEETALOO VALLEY.

Papers, "Hobbies" and "Tomato Growing," were read by Miss Ryan and Mrs. Pearce at the March meeting. Mrs. Pearce (Secretary) entertained members at her residence on 12th April.

BELALIE.

Before an attendance of 21 members and five visitors Mr. K. Davies on 12th April gave a demonstration of how to cut up a side of mutton and how to bone and roll joints of beef for cooking. (Secretary, Mrs. E. L. Orchard.)

BOOR'S PLAINS.

Members of both Branches held a combined meeting at Mrs. H. Queale's residence on 3rd March, when Mr. C. Dunstone gave an address on a trip to Queensland. Mrs. Queale then spoke on "Jams and Preserves." On 7th April, at Mrs. M. Ward's homestead, Mrs. Chynoweth gave a number of pudding recipes. (Secretary, Miss L. Stanway.)

CHARRA (New Branch).

The inaugural meeting of the Charra Branch was held on 12th March. A programme was arranged and officers elected. (Secretary, Miss M. Haseldine.)

CLARE.

On 5th March 25 members and four visitors accepted the invitation of Mrs. Catford to hold the meeting at her residence. The vegetable and flower gardens and large poultry run were inspected. The competitions conducted at the April meeting resulted as follows:—Pastry, first prize, Mrs. W. McKendrick. In the Small Cakes Competition Mrs. W. Miller exhibited the best entry. On 5th April members inspected the packing shed of the Stanley Dried Fruits Association. (Secretary, Mrs. A. Pollock.)

COONALPYN.

Members exhibited specimens of needlework and showed how to make various stitches at the April meeting. A Scone Competition was held on 11th May, Mrs. R. V. Potter and Miss E. Dixon being the successful competitors. (Secretary, Mrs. C. Leonard.)

COONAWARRA.

An Exhibition of Handicrafts and Social Afternoon was held on 16th March and was attended by 38 members and 30 visitors. Members from the Penola Branch and visitors from surrounding districts made eulogistic references to the excellence of the exhibits. (Secretary, Miss O. Lear.)

ECHUNGA.

Mr. Clarke, of the Singer Sewing Machine Company, gave an instructive demonstration, and Miss Warwick showed members how to make buttonholes at the April meeting. There was a very good attendance of members. (Secretary, Mrs. F. Dennis.)

GEORGETOWN.

Twenty-seven members attended the Cooking Competitions held on 7th March. The following competitors being successful:—Miss Hynes, Mrs. G. Smallacombe and the Secretary Mrs. E. Buckenard.

Display of Handicrafts and Flowers.

Mrs. J. A. Lyons opened the Annual Display of Handicrafts and Flowers which was held in the Town Hall on 13th April. Three hundred entries were received and the prizewinners were as follows:—

Supper Cloth—Mrs. H. Freeman, 1; Mrs. Hartman, 2.

White Work—Miss M. Myatt, 1 and 2.

Coloured D'Oyley—Miss L. Noonan, 1; Miss Lyons, 2.

White D'oyley—Mrs. Scott. 1 and 2.

Plain Apron—Mrs. G. Smallacombe, 1; Miss Higgins, 2.

Cross Stitch—Mrs. Hartman, 1; Mrs. Bond, 2.

Article not to cost more than One Shilling—Mrs. Hartman, 1; Miss Wilkins. 2.

Knitted Garment—Miss Wilkins, 1; Miss Hynes, 2.

Knitted Baby's Set—Mrs. McDonald, 1; Mrs. Hartman, 2.

Knitted Socks—Mrs. Hartman, 1; Mrs. W. B. Sanders, 2.

Tea Cosies—Miss Hynes, 1 and 2.

Cooking.—Pound Cake—Mrs. J. Carmody, 1; Miss C. Carmody, 2.

Sponge Roll—Mrs. B. J. Myatt, 1; Mrs. Lyons, 2.

Butter Sponge—Mrs. Lyons, 1 and 2.

Scones—Mrs. T. Myatt, 1; Mrs. Carmody, 2.

Cream Puffs—Mrs. Lyons, 1; Mrs. Hinton, 2.

Jam Tarts—Miss Hynes, 1; Mrs. Smallacombe 2.

Sausage Rolls—Miss D. Smallacombe, 1; Mrs. P. M. Smallacombe, 2.

Small Cakes—Miss Hynes, 1; Miss K. Miller, 2.

Biscuits—Miss C. Carmody, 1; Mrs. G. Smallacombe, 2.

Sweets.—Best Collection of Sweets—Miss C. Carmody, 1 and 2.

Toffee—Miss McDonald, 1; Miss L. Noonan, 2.

Preserves.—Jam—Mrs. Lyons, 1; Mrs. O'Connell, 2.

Pickled Onions—Mrs. Hartman, 1; Mrs. Vaughton, 2.

Mustard Pickles—Mrs. Lyons, 1; Mrs. G. Smallacombe, 2.

Best Pound of Butter—Mrs. Hinton, 1; Mrs P. M. Smallacombe, 2.

Best Dozen of Eggs—Miss Higgins, 1; Miss. Wilkins, 2.

Hooked Rugs—Miss K. Miller, 1; Mrs. Buckenara, 2.

Flowers.—Bowl Dahlias—Mrs. Crawford, 1; Mrs. Buckenara, 2.

Vase of Dahlias—Mrs. Crawford, 1 and 2.

Bowl of Roses—Mrs. O'Connell, 1; Mrs. Lyons, 2.

Vase of Roses—Miss Wilkins, 1; Mrs. Lyons, 2.

Bowl of Mixed Flowers—Miss Hynes, 1; Mrs. Crawford, 2.

Vase of Mixed Flowers—Miss Wilkins, 1; Miss Buckenara, 2.

Vase of Cosmos—Miss Wilkins, 1; Mrs. Crawford, 2.

Vase of Chrysanthemums—Miss Wilkins, 1; Miss Higgins, 2.

Posies—Mrs. G. Smallacombe, 1; Mrs. McDonald, 2.

Shoulder Spray—Mrs. G. Smallacombe, 1; Mrs. Buckenara, 2.

Gent's Button Hole—Mrs. Buckenara, 1 and 2.

Table Rockery—Mrs. Buckenara, 1; Mrs. McDonald, 2.

Pot Plant—Miss Wilkins, 1; Miss D. Smallacombe, 2.

Window Box—Mrs. Hartman, 1; Miss Hynes, 2.

Best Collection of Vegetables—Mrs. Hartman, 1; Mrs. Lyons, 2.

HOPE FOREST AND DINGABLEDINGA.

A Recipe and Sample Afternoon was held on 3rd March, and a demonstration of Fruit Preserving without an outfit was given by Mrs. Wollaston and Mrs. Justice. Numerous recipes were exchanged.

A novel meeting in the form of an exchange of plants and seeds was held at Mrs. Nicol's residence on 7th April, and on 3rd May members discussed arrangements for the Annual Handicraft Display. (Secretary, Mrs. A. Schroeder.)

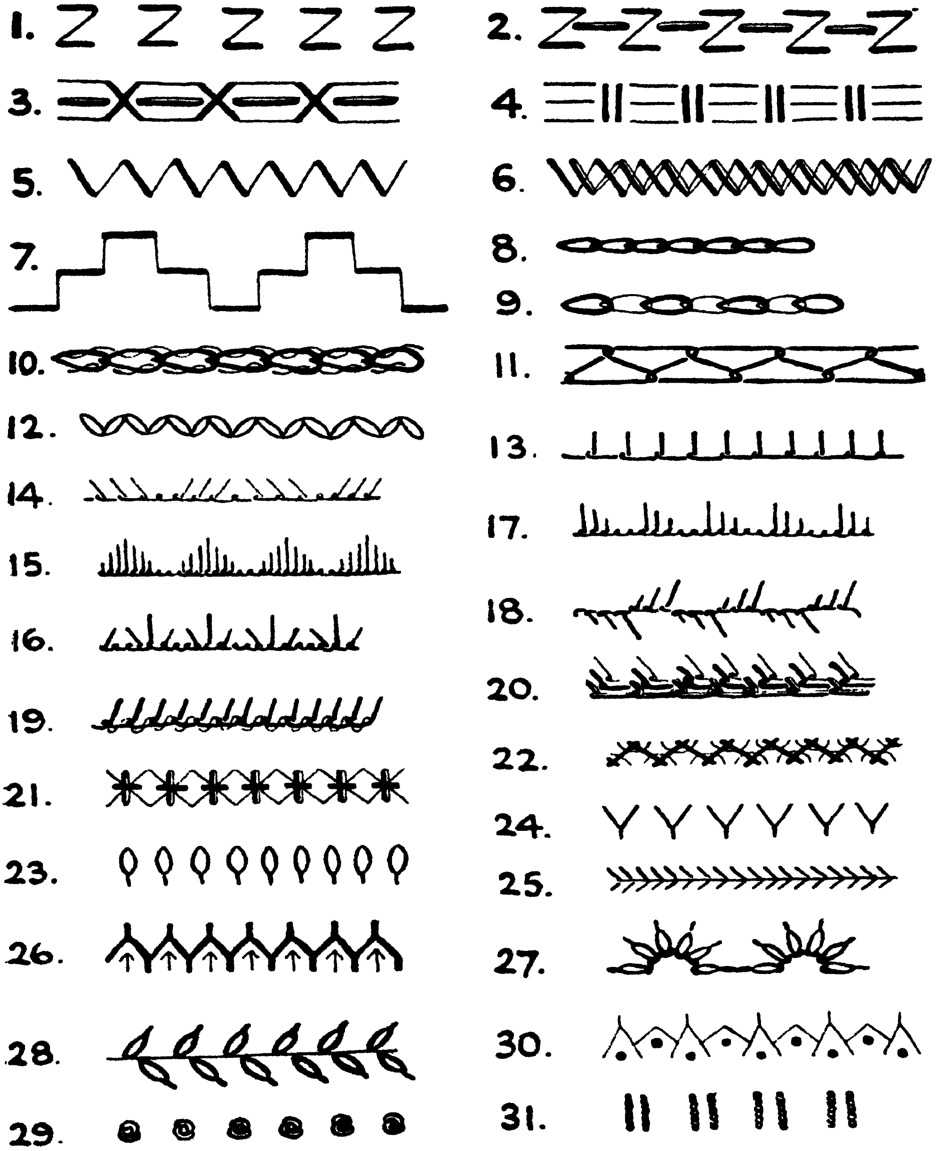
KARTE.

Fancywork Stitches.

The following paper was read by Miss A. Trowbridge at the March meeting:—The first and perhaps the most used is the *Stem Stitch.* Begin by bringing the thread up at the end of the stem, or line, take a small upward stitch and bring the needle up again at the beginning of the thread and continue to work along the line, with straight, upright stiches of even length; always bringing the needle back and up at the end of the last stitch. The wrong side should look like fine backstitch. This stitch, if closely worked in lines with one strand of standard cotton, makes a most effective stitch for filling in ribbons, leaves and large or small spaces.

Snail Trail is another very easily worked stitch suitable for outlines, veins, stems, &c. To begin, bring the thread up from the under-side of the material and

FANCY STITCHES.



REFERENCE —

■ = 1 colour. □ = 2 colours ▤ = 3 colours ▥ = 4 colours

KEY TO STITCHES.

1. *The "Z" stitch,* large running stitch, joined by hemming stitch.
2. *The "Z" stitch* linked by a row of tacking.
3. *"Link" stitch,* two rows of tacking joined by a "Cross" stitch, and linked with another row of tacking.
4. *"Post and Rail" stitch,* three rows of running, with two upright tacking stitches.
5. *The "V" stitch,* hemming two ways.
6. *The "Diamond" stitch,* two rows of "V" stitch overlapping.

Key to Stitches—*continued.*

7. *"The Step Stitch,"* horizontal and upright darning.
8. *The Single Chain stitch.*
9. *"Magic" chain,* the chain stitch worked in two colours.
10. *"Laced" chain,* the single chain stitch, laced with a different colour.
11. *"Double" chain,* the chain stitch worked openly.
12. *"Zig Zag" chain,* the chain stitch worked on the slant.
13. *"Blanket" stitch.*
14, 15, 16, 17, 18. Variations of *"Blanket" stitch,* suitable for hems.
19. *"Laced" blanket,* simple lacing into "Blanket" stitch.
20. *"Battlement" stitch,* three rows of "Blanket" stitch done on the slant.
21. *"Star" stitch,* cross stitch, running through the cross and upright tacking.
22. *Laced Herringbone stitch.*
23. *Lazy-daisy stitch.*
24. *"Y" stitch,* open lazy-daisy stitch.
25. *"Feathery" stitch,* the lazy-daisy stitch worked closely together.
26. *"Gable" stitch,* two rows of arrow stitch with a tacking stitch.
27. *"Sun" stitch,* lazy-daisy stitch worked in half-circles.
28. *"Leaf" stitch,* lazy-daisy stitch and a darning stitch.
29. *French knots.*
30. *"Tent" stitch,* lazy-daisy hemming, and French knots.
31. *Bullion stitch.*

hold down firmly with the thumb on the line to be followed. Insert the needle into the material at the left side of the thread. Bring the needle up on the right side and through the loop. This, when pulled tightly, forms a knot. Repeat the stitch to form a knot about ½in. apart to the end of line to be worked. This stitch looks best if worked in a thread that is not too fine, such as pearl cotton or cotton-a-broder.

Divided Satin Stich.—If a leaf or scroll is too wide to be worked in Satin Stitch, it may be divided on the centre line and worked in 2 sections. If the leaf is veined, lay the padding in 2 sections and work each side separately.

Satin Stitch consists of placing parallel stitches over a given design, allowing no break in the surface. It is not possible to cover large designs in this way, unless they are such as may be broken into sections as shown in divided Satin Stitch, because the stiches will not lay well if they are too long. All Satin Stitch should be padded.

Long and Short Satin Stitch or Indian Filling.—This stitch always begins on the outside or extreme edge of the design which it is intended to define, and being carried right through the material it becomes both sides alike. Every other stitch is long and every other short, but in working they cannot be all exactly the same length, but must vary in themselves. The size of the leaf also varies the length of large and short stitches.

Seed Stitch.—Take small Back Stitches, according to design, evenly spaced, the stitches of one row falling midway between those of the rows above and below. For larger spaces, make two stitches instead of one into same place.

Thousand Flower Stitch.—Each petal is made of 1 stitch from the centre of the flower to the end of the petal. Centres of flowers may be filled with French knots.

Lazy Daisy or Barley Stitch.—First bring the thread up again and insert where the needle came up; take the stitch to the desired length, twist around the point of the needle, draw the needle through, bring the thread up to the end of the loop and take the stitch the desired length for finishing. For Lazy Daisy, shorten stitches for finishing.

Bullion Stitch is used for making wheat, corn ears, barley, and small flowers, &c. With the thread brought up to the right side of the material, take a stitch the length desired for a bullion-like coil, bring the needle out, and before pulling it through, wind the thread around the point of the needle a sufficient number of times to cover the length of the stitch taken; do not wind too tightly. Pull through, holding the coiled thread with the left thumb and when these are in proper place, stitch back again to the wrong side as closely to the starting point as possible.

French Knots.—Bring the thread up to the right side and hold under the thumb. Twist the thread round the needle and insert the needle into almost the same place, holding until all the thread is drawn through the cloth and fasten with a stitch on the wrong side. In the Double French Knot, the thread is twisted twice around needle, the needle inserted into the material and drawn through as in a single French knot.

Long and Short Buttonhole is ordinary button hole, worked with one short and one long stitch alternately. This stitch is used effectively for embroidering large flowers, leaves and conventional designs, also for finishing edges, banded trimmings and for appliqueing one material to another.

The Committee who organized the Karte Annual Exhibition.

Double Buttonholing.—Work to the right, leaving a space between the stitches, turn and work back, filling in the space. This gives a Buttonhole Edge on both sides, suitable for when the material is cut out on either side.

Padding and Buttonholing.—First outline the scalloped section with running stitches, then complete padding and buttonhole stitches over padding.

Shell Edge is used for finishing scallops, the edge being finished with buttonhole stitch. Make a loop and buttonhole into this three or four times.

Back Stitch has a nice finishing effect where plain buttonholing or Satin Stitch is used.

Eyelet Work.—There are 3 different ways of working Round and Oval Eyelets. Outline the circle with running stitch and pierce with stiletto and overcast. The next one is commenced in the same way, but the edge is buttonholed instead of overcast, pearl edge inside. The last is a Wallachian Eyelet; pierce the centre with a very small hole then buttonhole; round, pearl edge being outside, taking all stitches to the centre. The Oval Eyelet run round eyelet, cut lengthwise, stroke back the turnings with needle and overcast. The next one is the Shadow Eyelet. To do this, first run outline, then run inner line or (if not marked on transfer) pencil one in. Fill in with run stitches between these lines, cut centre and overcast. The next one is worked in the same manner, but the edges are buttonholed with pearl edge outside.

Oyster Stitch.—Begin as with Snail Trail, but instead of then proceeding with the next knot, put the needle under the thread above the knot, hold the thread under the thumb and draw through loosely. Take an upright stitch under the knot and draw tight, keeping a loop under the needle.

Fibrone Rose.—Commence by making a Satin Stitch centre, well raised and build round this with long stitches on the right side and short stitches on the wrong. Two or three shades of silk may be used, using darker shades for the centre. Leaves may be done Lazy Daisy on solid embroidery.

Blanket Stitch is a buttonhole stitch, worked with space between stitches and may be worked with one long and one short stitch. This stitch is used for finishing plain edges of materials which are not scalloped.

Webs.—Four strands evenly crossed, work back to the centre by twisting the thread over one of the strands, being careful to have plenty of cotton to complete the web. Fasten all strands together with a loop knot and work in either of the following ways:—Darning under and over the strands or putting the needle under the strand and taking a back stitch over the same strand, repeating until filled in.

Feather stitch is another useful and effective stitch for making lines, &c., and also makes a very dainty trimming for infants' or children's garments. Bring a thread up from the under side of the material on the line to be followed. Bring thread to the right side, hold it down with the left thumb and take a slanting stitch back to the line. Take the next stitch on the left side, inserting the needle opposite the end of the last stitch and take a slanting stitch back to the line—each stitch coming just a little lower than the previous stitch. This may be worked in two strands of cotton or pearl cotton.

Herring Stitch is used for filling in petals, ribbons, borders, &c. To work between two lines bring the needle up at the end of the right hand line, slant the stitch across, and take a short stitch on the left-hand side. Continue in this way across the space, keeping the slants true and the stitches even.

Cross Stitch.—A new version of an old art with all the distinguished charm of fine needlecraft is shown in designs of Cross Stitch which give the worker opportunity for displaying beautiful colour schemes. In Cross Stitch much depends on the shading, remembering that depth of colour on all flower petals runs deep down towards the centre, light and shade effect being obtained by placing of dark and lighter tones together, the darker shade giving depth to the shadow. The working of Cross Stitch is very simple, the most important thing being the direction of the stitches. These must be always in one piece of work and lay in the same direction. All top stitches in the Cross Stitch should point the same way, as this gives a uniform and pleasing effect to the work, which cannot be gained otherwise. It will be found easier, where possible, to make the stitches in one direction entirely across the row than to go back putting in the top stitches rather than to complete each cross separately. This, of course, applies to designs in which masses or lines of colour appear, and not to individual separate crosses; the latter must be completed one at a time in lines; care must be taken that all crosses meet.

Chain Stitch is used for outlining and often as a filling stitch. Bring the thread up from the under side of the material on the line to be followed, hold the thread down with the thumb and insert the needle in the same hole where the thread began; the thumb thus holds the thread in a loop. Take a stitch downward, bringing the needle up on the stamped line and inside the loop where the last thread comes out. To insure good work the stitches must be kept even in length.

Faggoting is quite simple, but makes a wonderfully attractive finish to summer or winter frocks, either executed as collars and cuffs or inserted in the frock. Working from right to left, after working two or three running stitches into the braid, strengthen with a very small backstitch, bring the needle out on front of the braid (quite near the edge), and following one of the sloped lines place the needle underneath the edge of the braid on the lower line, bring it through to the front of the braid, place the needle under the thread, continue along the next sloped line up to the top row, where the needle is again placed under the edge of the braid and brought through to the front. Continue until all lines are covered. (Secretary, Mrs. Fatze.)

KOOLUNGA.

Cooking recipes were exchanged at the March meeting which was attended by 24 members. On 22nd April a combined social meeting was held with the Koolunga and Redhill Welfare Clubs. (Secretary, Miss T. Whitehorn.)

KYBYBOLITE.

The meeting of 12th April took the form of a Question Box, and on 10th May Miss Moden spoke on "Scalp Treatment." (Secretary, Miss M. Moore.)

LONGWOOD (New Branch).

The first meeting of the recently formed Branch at Longwood was held on 20th April at Mrs. Marks' residence. Papers were read from the *Journal. Useful Hints.*—Mrs. E. Pfennig told members that when kalsomining walls a coat of alum water (strength, ½lb. alum to 1gall. hot water) applied to the walls would remove all stains. The alum water must be thoroughly dry before applying the kalsomine. (Secretary, Miss M. Porteous.)

Members of the newly-formed Branch at Longwood.

MALTEE.

A demonstration of woollen rug making was given by Mrs. T. Schwarz at the April meeting. Miss R. Schwarz won the Fruit Cake Competition. (Secretary, Miss S. Schwarz.)

MANGALO.

Members met at Mrs. O. Hannemann's residence for the March meeting, which took the form of a Question Box, and on 6th April Mrs. Morton read a paper, "Gardening." (Secretary, Mrs. B. Coles.)

McLAREN FLAT.

Thirty-six members were present at the May meeting. Mrs. W. Rau gained the highest aggregate points in the 12 months' Cooking Competitions, Mrs. Dyer was second, and Mrs. C. Oakley third. Miss G. Elliott, who has acted as judge during the year, was presented with a crystal salad bowl and servers. Mrs. Wilson showed views and curios which she had collected during her world tour. (Secretary, Mrs. S. Elliott.)

MILANG.

Mr. D. Eardley, of Tooperang, gave a lecture on Beekeeping at the January meeting. On 18th February Mr. C. F. Anderson (Government Poultry Adviser) addressed members. Sister Naismith gave a travel talk about South Africa on 18th March. (Secretary, Miss R. Whitfield.)

MILLICENT.

The Branch held its annual Flower and Cookery Competitions on 18th March, and it was largely attended, representatives from many branches being present. The entries, which were of a high standard, almost reached 200. Outstanding among the exhibits were the dahlias, asters, and zinnias, and the judges had no light task to judge these and other sections. The exhibition was opened by Mr. A. L. Warren (Horticultural Instructor of Mount Gambier). The Branch is indebted to the ladies who acted as judges—Flowers, Mrs. Alf. Fensom, Miss L. Magor, and Miss A. McArthur; cookery, Mrs. T. H. Bowman. The principal prize winners were:—Mrs. A. Varcoe, Mrs. A. Holland, Miss F. Carter, Miss J. Fensom, Miss S. Bowering, Mrs. R. Altschwager, Mrs. J. Hunt, Mrs. O. Watson, Mrs. O. Stratford, Mrs. E. Opperman, Mrs. J. Hunt, Mrs. H. Hutchesson, Miss G. Stuckey, Mrs. I. Altschwager, Mrs. G. Ellison, Miss F. Kay, Miss Z. Ellison, Mrs. Edgcumbe, Mrs. Redman, Misses B. and F. Rogers, Miss M. Bennett, Mrs. G. Thompson, Mrs. D. Osborne, Mrs. C. Hutchesson, Mrs. C. Todd, Mrs. T. Crowe, Mrs. McCord, Mrs. L. Davies, and Mrs. J. Alleyn.

On 14th April the Secretary (Mrs. Redman) reported that the Flower Show had resulted in a profit of £2. Various cooking recipes were exchanged.

MONARTO SOUTH.

Miss Hein presided over an attedance of 15 members at the April meeting. The Apricot Jam Competition was won by the Secretary (Mrs. F. Liebelt). Jam recipes were also read and exchanged.

NARRIDY.

At the meeting held on 5th March Mrs. M. Reynolds gave an address "Radiant Health," and on 2nd April Mrs. A. Thomas, of Crystal Brook, gave a travel talk on a trip overseas. (Secretary, Miss G. Roberts.)

NELSHABY.

On 21st April members debated the question, "Is it Necessary to be Wealthy to be Well Dressed?" Those members who supported the affirmative side of the question were judged the winners. (Secretary, Miss A. Laurie.)

O'LOUGHLIN.

Mrs. Pfieffer judged the Sponge Cake Competition which was held at the March meeting, and made the following awards:—1st, Mrs. E. Lutz; 2nd, Miss U. Kloeden; 3rd, the Secretary (Mrs. A. Kloeden).

OWEN.

The first of a series of homestead meetings was held at the residence of the Secretary (Miss D. McPharlin) on 12th April, and was attended by 15 members and five visitors. Miss McPharlin said that this meeting was an outstanding success, and recommends any Branch that has not tried this kind of meeting to make an effort to do so. A competition for the best starched and ironed supper cloth was won by Miss A. Harkness. Miss L. Burtt gave a demonstration of first aid at the May meeting, and she was awarded first prize for the best six decorated cakes.

PARRAKIE.

Mrs. Cabot read a paper, "Useful Hints," on 23rd March, and Miss L. Beelitz (Secretary) made an exhibit of cornflour cakes. On 13th April Mrs. F. Pfieffer read a paper, "Chocolate and Its Uses." In recognition of her services to the Branch Mrs. Ross was presented with a brass jardinere on the occasion of her leaving the district; 22 members and 11 visitors were present.

PENOLA.

At the February meeting, Dr. Oaten gave an address on the "Life of Louis Pasteur." The following notes have been supplied by the Secretary, Miss A. Marks:—From a lowly origin and with few chances of learning and advancement, Dr. Louis Pasteur rose to be one of the greatest benefactors to mankind. By his work on crystals of tartaric acid he split them up into four classes, each class having its own work to do for the advancement of science. By placing yeast in its various stages of putrefaction under the miscroscope, he discovered that at a certain temperature the yeast "worked" in the manufacture of beer without the beer becoming sour. By a similar process wine was treated, this prevented heavy loss by distillers.

Milk, heated to between 50-60°C. was pasteurized. This preserved the milk but did not destroy some of the nutritive properties which were destroyed when the milk was scalded. He was responsible for the eradication of a disease among silkworms. During the Franco-Prussian War he insisted on the sterilisation of all surgical instruments and scrupulous cleanliness in dressings, thereby lessening mortality by ⅓ of those who had been wounded.

By culturing *Bacilli Anthrax* and injecting same into sheep he saved farmers from heavy losses in sheep. He discovered that the virus in the saliva of a mad dog caused Hydrophobia or Rabies by a series of inoculations. He was able to cure this disease which previously had meant death accompanied by severe agony.

From the serum of the blood of horses an antitoxin was discovered which had proved very valuable in combating diphtheria.

At the April meeting 38 members were present to see a demonstration of Barbola Work and how to make flowers out of wood fibre by Mrs. Barclay of Port Augusta. During the afternoon she demonstrated the making of Sweet Peas and Roses, and also had on view violets, pansies, geraniums, daisies, camelias, and orchids made from wood fibre. Many novelties, such as book ends, brooches, match box containers and bridge novelties were shown in the Barbola Work.

PINBONG.

The April meeting was held at the residence of Mrs. C. H. Scholz. Miss D. Scholz showed a collection of biscuits and their recipes and Mrs. H. B. Scholz won first prize in the Lamington Competition (Secretary Miss J. Kammermann.)

PINNAROO.

A floral afternoon was held on May 6. The exhibits included miniature rockeries, floral carpets, bouquets and vases. Mrs. C. Mattiske made the following awards:—Best Novelty Floral Carpet, Mrs. Webster; Vase of Flowers, Miss Ruth Pearce. (Secretary, Mrs. M. Wirth.)

RENDELSHAM.

Papers on "Cool Drinks" and "Savouries" were read by Mesdames Andrews and Stratford at the March meeting which was attended by 15 members and 7 visitors. (Secretary Mrs. L. Bignell.)

SADDLEWORTH.

Reports on the Lower North Conference were discussed at the March meeting. The Annual Dahlia Show was held on April 12. At the May meeting members discussed the entries in the various sections at the Dahlia Show. (Secretary Miss G. Frost.)

SHEOAK LOG.

Mr. W. J. Spafford (Director of Agriculture) gave an illustrated lantern lecture at the meeting held on March 8.

Exhibition of Women's Work.

The Sheoak Log Branch held its first Bureau Show on March 10.

Entries were confined to Bureau members only and far exceeded expectations. Every member did her part to make the afternoon a success. There are 48 members on the roll and 411 entries were received.

The Show was opened by Miss Barnett of Gawler, who congratulated the branch on its fine show of work, flowers, vegetables, etc.

Trophies were won and presented by the following:—

Aggregate (highest number of points)—Mrs. D. Both, presented by Eudunda Farmer's Co-operative Union, Gawler; 2nd in the aggregate Miss K. M. Koch, presented by Mr. H. B. Crosby, Gawler.

A trophy was presented by Mr. Bowden for the member with the most entries, providing this member did not also win the aggregate; it was then to go to the next highest. As it happened Miss K. M. Koch, with 37 entries won the 2nd aggregate; Mrs. Bowden, with 32 waived her claim, as her husband presented it; Mrs. Both, with 27 entries, won the aggregate, so finally the trophy was passed to the fourth, Mrs. Ed. Koch, with 25 entries.

The winner of the best decorated cake, Mrs. D. Both, was presented with a trophy given by Mrs. A. E. Dahlitz.

Pound Cake—Mrs. T. Shannahan, presented by Mr. Scott.

Sponge Cake—Mrs. D. Both, presented by Mrs. E. H. Koch.

Supper Cloth in White or Cream Work—K. M. Koch, presented by Misses Zweck.

Best Article in the Open Section in Needlework Mrs. E. H. Koch (Afghan rug), presented by Mrs. C. Mattiske.

Champion Dahlia—Mrs. D. Both, presented by Mrs. T. Shannahan.

Tomato Sauce—Mrs. F. H. Koch, presented by Miss A. Mattiske.

The following are the prizewinners in the various sections:—

COOKING.

Sponge—Mrs. D. Both, Miss Z. Bammann.
Brown Sponge—Miss Z. Bammann.
Sponge Roll—Miss F. Mattiske.

Sultana Cake—Mrs. D. Both, Miss K. M. Koch.

Cream Puffs—Miss L. Schwarz, Mrs. Bowden.

Lamingtons—Mrs. H. Koch, Mrs. H. A. Dahlitz.

Plain Scones—Mrs. Pope, Miss K. M. Koch.

Sausage Rolls—Mrs. Ahrens.

Coffee Rolls—Miss K. M. Koch.

Fancy Cakes—Miss H. Koch, 1 and 2.

Peaches—Mrs. Menzel, Miss K. M. Koch.

Cream Lillies—Miss J. Argent, Mrs. Menzel.

Coffee Cake—Mrs. T. Shannahan.

Best Decorated Cake—Mrs. D. Both, Mrs. Window.

Ribbon Cake—Mrs. W. Both, Mrs. Wehr.

German Cake—Mrs. Geue, Mrs. D. Dahlenburg.

Bread—Mrs. D. Dahlenburg, Mrs. W. Both.

Collection Six Biscuits—Mrs. Bowden, Mrs. Argent.

Nutbread—Mrs. H. A. Dahlitz, Mrs. W. Both.

Pound Cake—Mrs. T. Shannahan, Miss K. M. Koch.

Collection Sweets—Miss H. Koch.

Jams, Jellies and Preserves—Collection Three Jams; Mrs. T. Shannahan, Mrs. Eden. Collection Three Jellies: Miss M. Dahlenburg. Marmalade: Mrs. Pope, Miss M. Dahlenburg. Fig Jam: Mrs. Sissman, Mrs. Bowden. Plum Jam: Mrs. L. Heinjus, Mrs. C. Mattiske. Apricot Jam: Miss T. Schwarz, Mrs. Ed. Koch. Collection Three Preserved Fruits: Mrs. Argent, Mrs. Bowden. Collection Three Preserved Vegetables: Mrs. Bowden. Collection Preserves: Mrs. Bowden.

Pickles, Sauces, Chutney, etc.—Tomato Sauce: Mrs. E. H. Koch, Mrs. Ed. Koch. Mustard Pickles: Miss M. Dahlenburg, Miss K. M. Koch. Vinegar Pickles: Miss F. Mattiske, Mrs. P. Dahlenburg. Chutney: Mrs. H. A. Dahlitz, Mrs. Bammann. Tomato Relish: Mrs. Bammann, Mrs. Bowden.

Produce.—One Pound of Butter: Mrs. W. Both, Miss F. Mattiske. One Dozen Eggs: Mrs. Bowden, Mrs. Ed. Koch. Six Tomatoes: Mrs. Wehr, Mrs. Ed. Koch. Apple Cucumbers: Mrs. Mitchell, Mrs. Menzel. Green Cucumbers: Mrs. Both. Bunch of Redbeet: Mrs. P. Dahlenburg, Mrs. Geue. One Pound Beans: Mrs. Heinjus, Mrs. Geue. Trombone: Mrs. H. A. Dahlitz. Turkshead: Mrs. Geue, Mrs. A. E. Dahlitz. Piemelon: Miss R. Schwarz. Bunch Carrots: Miss R. Schwarz, Mrs. Heinjus. Potatoes: Mrs. H. A. Dahlitz.

FLOWERS.

Bowl Dahlias—Mrs. G. Mitchell, Mrs. P. Dahlenburg.

Champion Dahlia—Mrs. W. Both.

Pompom Dahlia—Mrs. W. Both, Mrs. A. E. Dahlitz.

Cacti Dahlia—Miss L. Schwarz, Miss H. Koch.

Collection Six Dahlias—Miss L. Schwarz, Mrs. W. Both.

Three African Marigolds—Miss S. Dahlenburg.

Three Guinea Gold Marigolds—Mrs. Both.

Three Balsam—Miss S. Dahlenburg.

Three Zinnias—Mrs. P. Dahlenburg, Mrs. C. Schuster.

Three Sunflowers—Miss L. Schwarz.

Three Carnations—Miss S. Dahlenburg.

Vase Phlox—Mrs. Ed. Koch, Miss A. Mattiske.

Bowl Salvias—Miss L. Mattiske.

Bowl Mixed Flowers—Mrs. T. Shannahan, Miss S. Dahlenburg.

Posy—Miss S. Dahlenburg, Miss H. Koch.

Shoulder Spray—Miss K. Koch, Mrs. Bowden.

Fern—Miss D. Dahlenburg, Miss A. Mattiske.

Coleous—Mrs. D. Dahlenburg, 1 and 2.

Begonia—Mrs. D. Dahlenburg, Miss H. Koch.

Miniature Rockery—Miss H. Koch, Miss K. M. Koch.

Vase of any Flowers not Specified—Mrs. W. Both, Mrs. Ed. Koch.

NEEDLEWORK.

Worked Cushion—Miss K. M. Koch, Miss J. Argent.

Knitted Cushion—Miss Evelyn Sissman, 1 and 2.

Fancy Apron—Mrs. Menzel.

Tatted D'oyley—Miss S. Dahlenburg, Mrs. D. Dahlenburg.

Duchess Set in Coloured Work—Miss P. Tremlett, Mrs. Heinjus.

Knitted Tea-cosy—Miss K. M. Koch.

Bedsocks—Miss K. Bammann.

Crotchet Suppercloth—Mrs. D. Dahlenburg.

Any Article in Smocking—Mrs. E. H. Koch.

Any Article in Tapestry—Miss K. M. Koch.

Guest Towel—Mrs. Menzel, Miss H. Koch.

Worked Nightgown—Mrs. Ed. Koch.

Cream or White Worked Centre—Miss J. Argent, Miss Z. Bammann.

Coloured Worked Centre—Miss Z. Bammann, Miss J. Argent.

Two White Worked D'oyleys—Miss K. M. Koch, Miss J. Argent.

Two Handkerchiefs—Miss K. M. Koch, Mrs. W. Both.

Coloured Worked Suppercloth—Miss K. Bammann.

Cream or White Worked Suppercloth—Miss K. M. Koch.

Worked Teacosy—Mrs. P. Dahlenburg.

Two Crochet D'oyleys—Mrs. W. Both, Miss K. M. Koch.

Picture—Miss H. Koch.

Knitted Toy—Mrs. L. Heinjus.

Tea Towel—Miss H. Koch, Mrs. P. Dahlenburg.

Knitted Baby's Set—Mrs. W. Both.

Hooked Rug—Miss R. Schwarz.

Any Article not Specified—Mrs. E. H. Koch (Afghan rug), Mrs. Bowden (knitted jumper).

PAINTING.

Oilpainting—Mrs. Bowden, Miss I. Carmichael.

Watercolours—Mrs. Bowden, Mrs. Bowden.

MEN'S SECTION—FARM PRODUCTS.

Sample Wheat—Mr. Bowden, Mr. L. Heinjus.

Sample Cape Barley—Mr. A. E. Dahlitz, Mr. L. Heinjus.

Sample Malt Barley—Mr. G. Tremlett.

Sample Oats—Mr. Pope.

Sheaf Oaten Hay—Mr. L. Heinjus.

Sheaf Wheaten Hay—Mr. M. Wehr.

Afternoon tea was served in the supper room where the tables were tastefully decorated with pink phlox and blue aster.

Mrs. W. J. Dawkins of Gawler River gave an account of a visit to England during the Coronation at the meeting held on 12th May. (Secretary, Mrs. K. Koch.)

SNOWTOWN.

On 2nd February at Mrs. Pellew's residence, papers on "Salads" were read by Mesdames Freebairn and Pellew. Dr. Holland delivered an address, "Common Beliefs," at the March meeting, which was attended by 20 members and 15 visitors.

Educating the Pre-School Child.

Mrs. A. S. Andrews read the following paper at the April meeting:—Child education, a most interesting study, begins as soon as the child is born, the 5 senses gradually initiating him into the wonders and mysteries of the world in which he now lives. What a vast amount of knowledge the child must acquire before he reaches adulthood. How does he acquire it? Well, by both direct and indirect methods. By the time the child is 2 years of age he is quite an intelligent little person. He understands the language, can express himself more or less fluently, knows the geography of the house and yard, has attained the use of hands and feet, and is quite an ardent student of everyday affairs.

It is proposed to deal mainly with the 3 or 4 years now ahead of the child and show how they may be intelligently used by the mother to prepare him for his school days. Whether or not he attends a Kindergarten, he must learn to some extent what is taught therein.

THE KINDERGARTEN.

In the country where Kindergartens are out of the question, the mother, with no knowledge of Montessori methods or child phsychology, has the privilege of being the child's teacher during those years, and the child will never be more your own than then.

The Kindergartens are well equipped with the necessary aids for the purpose of educating the child and the wise mother will gather together material to occupy the child's time. What equipment is necessary?

It must be within the reach of the ordinary person. Most children are given toys, picture books, blocks, pencils, chalks, &c., and if a small table and chair is provided and a cupboard or box in which to stow the toys, &c., much untidiness is avoided and the child feels it has a place in the scheme. Handwork forms a major part of Kindergarten teaching, so provide the child with scissors, beads, coloured threads, needles with large eyes, pictures to cut out and paste with which to paste them, a brown paper scrap-book easily made from a piece of paper, stitched on the machine, an old magazine, a pot of paste and some scissors and the child is happy for an hour or so.

Too much direct teaching is not recommended in this pre-school period. Rather should the child learn unconsciously—making everything play—for that is the method used in the Kindergarten. But as education at school is divided into subjects, let us consider what foundation may be laid at home for these.

LANGUAGE.

The child can now speak well enough to be understood and baby language should be eliminated gradually. A "gee-gee" becomes a horse, a "moo-cow" a cow, "taa" is now "thank you," &c. The mother chats with the child in good English and wisely adds to the child's vocabulary by objects, picture books, &c.

Children love stories and even though the story is very simple the child listens engrossed. Every mother should be able to relate stories to the child and here there need be no excuse for lack of subject. All the old English fairy stories, such as Red Riding Hood, The Three Bears, the Nursery Rhyme stories, such as Jack and Jill, Humpty Dumpty, Little Bo-peep, Bible stories, Greek and Norse myths, Aesop's fables, history tales, &c., are quite suitable. I have found a nursery rhyme book a wonderful help in the teaching of language. The 3 years old is soon asking "What does gallop mean" and so on. Tales of a morbid or gruesome nature are naturally avoided.

READING.

The foundation for reading is best laid by introducing the alphabet by means of picture books. With the help of an ABC book a very small child can soon recognise the different letters. These may be drawn on paper or blackboard with colours, teaching the long sounds of course, when children go to school they learn the short sounds. When a child is about to start school teach a few short words like "cat," "mat," &c. Just knowing a few words gives the child great confidence during the first school days.

ARITHMETIC.

Arithmetic is easy to teach at home, far easier than at school. Any child is observant enough to notice that whereas he has 2 legs, a horse has 4, but he must first be taught to count. A child who can count to 100 before going to school will not find arithmetic hard. How will he learn; on his fingers and toes first of all. Then there are numerous ways that will suggest themselves to a mother, such as counting eggs, &c. Let the child have a money box he can open and he will delight in learning to count his money. A tiny tot can learn to recognise the different coins and how to change them. A box of blocks, a box of dominoes, a pack of playing cards, a snakes and ladder game are all useful aids in the understanding of numbers and figures.

On wet days when 4 years old tires of his play, show him how to make figures. When weighing ingredients for cakes, introduce the scales and weights. You do not have to teach the table of weights to the child. For he is learning by actual objects, considered the very best method by the greatest teachers. Empty match boxes, cotton reels, corks and old fancy buttons make useful counters for children.

WRITING.

He need be no stranger to the art of writing when starting school if a blackboard and chalk have been provided, and pencil and paper supplied on demand. A little chat and story about a letter and the child is soon trying to make it. The first efforts, however crude, should be encouraged and never on any account should a child be told "You cannot do that. It is too hard."

When ready to start school, a child should be encouraged to practise a few letters at home, and then when his first writing lesson is put in front of him he is pleased to find it easy.

POETRY.

Do not neglect to inculcate in the child a love of good verse, and the purchase of a good book of children's poems is recommended. These may be read as bedtime stories and will not only prove popular, but be found that if short poems are memorised when young, the memorisation of longer poems in later years is never hard. A. A. Milne's verses in "When we were very young" are very suitable, also the old nursery rhymes.

NATURE STUDY.

An appreciation of the beauties of Nature can be early instilled into the minds of the children, and here the equipment is lavishly provided; sunsets, stars, the moon, clouds, shadows, dewdrops, flowers, trees, birds, hills, seaside, &c. "Heaven lies about us in our infancy," and the child is living in a wonder-world into which grown-ups have almost forgotten the way.

The child should be encouraged to have a small flower garden of its own. A vase which it is the child's privilege to keep filled with fresh flowers will stimulate a love for Nature which will never be lost. The names of the flowers should be taught and thus the vocabulary is built up.

DRAWING.

Every child loves to draw and most mothers can entertain with pencil and chalk, and much amusement is derived while the child gradually learns to use the muscles of his fingers to advantage.

Without enlarging on subjects, such as music, history and geography, it will be seen that the child does lay a foundation for all of these before entering the school room, the better the foundation the easier and more enjoyable will school be for the child, for confidence is the best companion for the little 6-years-old on the way to school. A child whose confidence has been shaken by threats of what will happen to him when the teacher gets hold of him may take a lot of winning, but the fortunate child whose wise parents have fostered an interest in school and its affairs starts off for school in a glad, happy frame of mind and, fortunately, in these enlightened days, comes home after his first day's experience quite as happy as he went. (Secretary, Mrs. M. Jenkins.)

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A. P. BLESING, *Minister of Agriculture*

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Agricultural Bureau Conferences, 1938

Pinnaroo Line, at Parilla, Tuesday, 9th August (Mr. J. W. D. Carman, Parilla).

Murray Lands (West), at Karoonda, Thursday, 11th August (Mr. H. J. Elliot, Box 31, Karoonda), Kulkawirra Branch.

Southern, at Strathalbyn, altered to Wednesday, 17th August (Mr. Reg. Sissons, Strathalbyn).

Mid-North, at Narridy, Thursday, 25th August (Mr. J. Klingner, Crystal Brook).

Eyre's Peninsula (East), at Cleve (Yadnarie Branch), Monday, 17th October (Mr. H. W. Zinkler, Cleve).

Eyre's Peninsula (Central), at Wudinna, Friday, 21st October (Mr. C. W. Johns, Wudinna).

Each Conference will commence at 10.30 a.m. Papers and questions for the agenda of any Conference should be submitted about a fortnight before the date on which it will be held.

Overseas Wheat Quotations

By courtesy of the New South Wales Marketing Bureau, the South Australian Department of Agriculture is supplied regularly with statements showing overseas quotations for wheat to the nearest eighth of a penny. The accompanying table gives weekly quotations in the State or country of origin of the wheat, and months of shipment or delivery.

Date of Quotation.	Values elsewhere than in Sydney are expressed in English Currency.								
	S. Aus. Wheat.	W. Aus. Wheat.	Manitoba No. 3. *	Argentine Wheat.	Karachi Choice White Wheat.	American Hard Winter Wheat. †	White North Pacific Wheat.	Russian.	
1938.	June. *s. d.*	June. *s. d.*	July. *s. d.*	*s. d.*	June-July. *s. d.*	June. *s. d.*	*s. d.*	June-July. *s. d.*	
June 9..	3 9¾	3 10½	4 6⅜	—	3 7½	4 1⅜	—	3 10⅞	Victorian Sales (afloat) at 3s. 10¾d. to 3s. 11¼d.
June 16..	4 0	4 0¾	4 10½	—	3 9⅝	4 8½	—	4 1½	—
June 23..	3 11¼	4 0⅜	4 11⅛	—	3 9	4 5¼	—	3 11¼	—
June 30..	3 11½	4 1⅛	4 8⅛	—	3 9¼	—	Aug. 3 7¾	3 10⅛	New South Wales—Sales (afloat) 4s. 0⅜d.
	July.	July.	July-Aug.		July.	July.		July.	
July 7..	3 10⅞	4 0⅜	4 6	—	3 9⅝	4 1½	3 6⅝	3 9⅞	—

* *Ex* Atlantic ports. † *Ex* Gulf Coast.

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Converting Wheat into Pork

[By W. J. Spafford, Director of Agriculture.]

When the price of wheat falls below what is considered to be an economic level farmers frequently wonder whether the grain could not be utilised to better advantage, rather than selling it for milling purposes. There is no doubt that there are price levels below which it would be profitable to convert wheat into eggs, milk, or meat, but it is quite impossible to state with any definiteness just what these prices are, because the products to which the grain might be converted vary in price as do all primary products. Nevertheless, it is possible to show what the wheat would be worth on the farm if converted into a saleable article, provided that the value of the article produced by the use of the wheat is known. For instance, if it is known what the price per pound on the farm is to be for pigs raised on wheat, it is easy to calculate what would be the value of the grain used in the production of the animals.

It is a matter of common knowledge that wheat is an excellent grain for the production of pork, more particularly if fed in association with a highly proteinous foodstuff, such as meat meal or skim milk. Not only does wheat produce pork and bacon of the best quality, but unless the price of the grain is relatively high, or the price of pork is relatively low, the use of wheat for pig feeding is generally an ecomonic proposition, and under existing conditions much of the wheat now milled could be advantageously converted to pork.

In the pig-feeding experiments concluded at Roseworthy Agricultural College in 1936, it was found that when baconer pigs received wheat and water only it took 4.99lbs. of grain for every pound of increased weight made by the animals, but when meat meal was supplied as well as wheat, 1lb. of increased weight was made for every 3.92lbs. of wheat and 0.19lb. of meat meal, and when the daily ration contained wheat, skim milk, and green lucerne it took 3.15lbs. wheat, 3.15lbs. skim milk, and 0.78lb. green lucerne for every pound of increased weight gained by the pigs.

Feeding Wheat Only to Pigs.

Although it is far from the best practice to feed grain only to pigs, it is sometimes done, and with fairly good success. When plenty of good greenstuff is available, the supplying of one of the cereal grains as the only additional foodstuff is often highly profitable, but the position is not quite so good when grain of a single cereal and water are all that are given to pigs, nevertheless, depending upon the price of the grain at the time, even this system is sometimes economically sound.

Value of Wheat When Fed Alone to Pigs.

Wheat Required to Produce 1lb. Increased Live Weight.	Value per Bushel of Wheat on Farm, when Pigs are Worth on Farm :—				
	3d. per Lb. Live Weight.	3½d. per Lb. Live Weight.	4d. per Lb. Live Weight.	4½d. per Lb. Live Weight.	5d. per Lb. Live Weight.
Lbs.	*s. d.*	*s. d.*	*s. d.*	*s. d.*	*s. d.*
4·5	3 4	3 10½	4 5½	5 0	5 6½
5·0	3 0	3 6	4 0	4 6	5 0
5·5	2 9	3 2	3 7½	4 1	4 6½
6·0	2 6	2 11	3 4	3 9	4 2

Wheat and Meat Meal for Pigs.

In the Roseworthy College results it took 3.92lbs. of wheat and 0.19lb. of meat meal for each pound of increase in liveweight of the pigs fed on the mixture, but if for the means of calculation we take the amount of ¼lb. of meat meal to be necessary for every pound of increased weight in the animals, we can arrive at what wheat is worth per bushel if it takes different amounts of the grain to lead to the increased weight. To permit of the calculations it must be remembered that with meat meal at £13 10s. per ton, the ¼lb. required is worth 0.36d.

Value of Wheat When Fed with Meat Meal.

Wheat Required (when Fed with ¼lb. Meat Meal) to Produce 1lb. Increased Live Weight.	Value per Bushel of Wheat on Farm, when Pigs are Worth on Farm :—				
	3d. per Lb. Live Weight.	3½d. per Lb. Live Weight.	4d. per Lb. Live Weight.	4½d. per Lb. Live Weight.	5d. per Lb. Live Weight.
Lbs.	*s. d.*	*s. d.*	*s. d.*	*s. d.*	*s. d.*
3·75	3 6	4 2	4 10	5 6	6 2
4·0	3 3½	3 11	4 6½	5 2	5 9½
4·25	3 1	3 8½	4 3½	4 10½	5 5½
4·5	2 11	3 6	4 0½	4 7	5 2

Wheat, Skim Milk, and Lucerne for Pigs.

In most of the important pig-producing countries of the world grain is fed to the animals in association with skim milk and green feed, and in adopting this mixture in the Roseworthy tests it was found that when equal weights of wheat and skim milk were supplied it took 3.15lbs. of each and 0.78lb. of green lucerne to produce a pound increase in liveweight of the pigs. With skim milk valued at 1d. per gallon and green lucerne at 30s. per ton, the cost of the necessary amounts of these materials to use in conjunction with wheat is worth about ½d. for every pound of increase in liveweight, and so this figure is adopted in the following calculations of the value per bushel of wheat fed to pigs with milk and green fodder.

Value of Wheat When Fed with Skim Milk and Lucerne.

Wheat Required (when Fed with 1lb. Skim Milk and 1lb. Green Lucerne) to Produce 1lb. Increased Live Weight.	Value per Bushel of Wheat on Farm, when Pigs are Worth on Farm :-				
	3d. per Lb. Live Weight.	3½d. per Lb. Live Weight.	4d. per Lb. Live Weight.	4½d. per Lb. Live Weight.	5d. per Lb. Live Weight.
Lbs.	s. d.	s. d.	s. d.	s. d.	s. d.
2·75	4 6½	5 5½	6 4½	7 3½	8 2
3·0	4 2	5 0	5 10	6 8	7 6
3·25	3 10	4 7½	5 4½	6 2	6 11
3·5	3 7	4 3½	5 0	5 8½	6 5

In the above calculations of value per bushel of wheat used, no allowance whatever has been made for the labour nor incidental expenses involved in the raising of the pigs, and strictly speaking the figures should be shown as "value per bushel plus costs of management," or, in other words, the value per bushel is the sum shown minus the costs involved in utilising the amount of food stuff containing one bushel of wheat.

The Present and Probable Future of the Australian Export in Lambs

[By G. A. W. Pope, General Manager, Government Produce Department.]

Since the Ottawa Agreement, an annual quota is fixed by the British Government for the importation of meat into the United Kingdom. Incorporated in that Agreement is a promise that the Dominions shall be given an increasing share of the home markets, based on what is called the "standard year" of 1931-32, but the British Government reserved the right to regulate imports to a quantity that would stabilise market prices at a level that would be payable to English farmers.

The Dominions have had an increasing share of the markets. Although English farmers have received better returns than they were obtaining before Ottawa, the National Farmers' Union of England are now pressing the Minister of Agriculture to curtail importations because of their unsatisfactory position in regard to mutton and lamb. In their published statements they expressed the hope that the question would come before the Empire Producers' Conference, held in Sydney.

The first three resolutions passed at this Conference, which was held in March-April, 1938, read:—

1. That this conference accepts the Ottawa "order of preference," *i.e.*, that the local producer is entitled to first place in his local market; other Empire producers second place, and foreign producers third.
2. That this conference accepts the need for securing the expansion of Dominion supplies of primary products to the United Kingdom market so far as is economically possible.
3. That this conference accepts the need for orderly marketing of Empire primary products in order to maintain continuity of supplies and to prevent avoidable gluts and resultant instability of price levels and speculation.

The significance of these resolutions seems to be that there is a saturation point beyond which gluts and uneconomical conditions will prevail in the markets and that British farmers are becoming alarmed at the rapid growth of certain exports from the Dominions. At present the fear is in regard to mutton and lamb, but it may extend to other perishable products as time goes on. A glance at ruling prices on present markets, however, will show how dissimilar are the conditions. The quotations are:—

	English. Per lb.	Imported. Per lb.
Prime mutton ..	7½d. to 8½d.	4⅞d. to 5¼d.
Prime lamb	11d. to 1/2d.	7⅜d. to 7⅝d.

The English farmers state that the present prices they are receiving are unpayable, while we in Australia have a profitable industry at the present level of prices for our lambs in England.

The distinction is that they are catering for a luxury trade and therefore cannot expand their output without reducing prices nearer the level of the imported meat, and the English farmer is gradually losing a percentage of those customers who were prepared to pay the premium for home grown meat until they became aware of the excellence of the best imported.

Australia's Future.

The quota granted Australia for lamb and mutton for the year ending 30th September, 1938, was 1,850,000cwts., and it is now evident that we will not be able to fill it.

There would be no difficulty in obtaining a similar quota for the year commencing 1st October next, but, owing to the drought in New South Wales and Victoria, it is fairly evident that such a large quantity will not be required.

The following Tables show the increases that have taken place over what is termed the Ottawa standard year:—

	Mutton. cc.'s.	Lamb. cc.'s.
1931-32 (standard year)	1,168,700	3,203,654
1932-33	879,373	3,603,485
1933-34	1,086,705	4,202,040
1934-35	1,319,668	4,441,090
1935-36	665,411	4,747,478
1936-37	1,027,978	4,942,114
1937-38 (to 30/4/38) ..	913,069	4,763,244

Notwithstanding these remarkable yearly increased exports — and it is to be pointed out that New Zealand has also been steadily increasing—the market has absorbed the meat without difficulty and the prices remain at a very payable level. To-day the stocks in store are lower than they were at this time last year.

It is estimated that the increased consumption in 1937 was 1,500,000 carcasses and that the consumption this year for the first two months has exceeded that of the same period last year by about 30,000 carcasses per week. Should it be true that New Zealand has about reached the peak of its capabilities in the production of lambs, and if consumption continues to advance, the increased trade will mostly benefit Australia.

On the other hand, the British Government may find it necessary to insist on a "stand still" policy, when Australia might decide to curtail the export of old ewes, etc., to make room for any expanding production that was taking place in lambs. In my opinion there is still room for such an expansion, but producers would be well advised to think carefully before discarding wool production, dairying and pig raising on suitable farms.

The Australian Meat Board has had a survey made of the lamb industry from the production standpoint, with a view to formulating a scheme for improving quality and studying where and how increased production is possible. This scheme is not yet drawn up but the board has published the following statement:—

> The report of Mr. J. M. Coleman, Sheep and Wool Instructor of the Department of Agriculture of New South Wales, whose services were engaged by the board to make a special investigation of the Australian fat lamb industry, was considered by the board. It was decided to circulate the report to the heads of the Departments of Agriculture in the various States and ask them to meet representatives of the board at a conference to consider the report and discuss the formation of a common policy towards the implementing of those of its recommendations which are approved. This conference, if approved, will probably be held in July.
>
> The report contains recommendations regarding considerations of breeds, feeding and general production organization which, if implemented, should have the desired effect in promoting uniformity throughout the Commonwealth and assisting to raise quality standards.

Pig Meats.

There is a great necessity to endeavour to induce producers to pay more serious attention to the production of pigs for export.

South Australia has about the best climatic conditions and perhaps the cheapest foods for pigs in the world, and yet we are making very little headway.

England, by embargoes and preferences, has created a market that is stable at payable prices and is in need of larger supplies from the Dominions.

Although a quota is arranged each year for porkers and baconers, it is more in the nature of finding out what we can supply than an endeavour to curtail our shipments.

Tubercle Free Herd Scheme.

The following herds have been tested and comply with the conditions laid down by the Tubercle-Free Scheme, whereby stud-owners may apply to have their herds tested, free of charge, by the Stock and Brands Department:—

Owner and Address.	Cattle. No. of	Date. Expiry
1. J. H. Dawkins, Para Wirra Jersey Stud	25	16/4/38
2. W. Hawker, Anama Friesian Stud, Central Bungaree, *via* Brinkworth	37	25/11/39
3. O. H. Woodward, Marama Jersey Stud, Gilles Plains	22	2/11/38
4. G. L. Hampton, Cloverdale Illawarra Shorthorn Stud, Echunga	25	12/8/39
5. J. M. Bray, Sweethaven Jersey Stud, Langhorne's Creek	26	19/8/39
6. Kybybolite Experimental Farm, Kybybolite	88	1/9/39
7. A. Kelly, Alexandra Jersey Stud, Milang	38	21/10/39
8. Agricultural College, Roseworthy	70	9/11/39
9. E. F. Schulz, Eden Valley	30	16/12/39
10. M. A. Clark, Echunga	6	19/11/39
11. A. R. Withers, Nalpa Station, *via* Strathalbyn	251	6/4/40
12. J. H. Dawkins, Para Wirra Jersey Stud, Gawler River	24	7/4/40
13. J. F. Dodd, "Lallawa" Jersey Stud, Meningie	49	11/5/40

McLaren Flat Pruning Competitions

Under the capable Committee of Management led by Mr. P.T. Wait (Chairman), and Mr. G. Roe (Secretary), the McLaren Flat Branch of the Agricultural Bureau held its Seventh Annual Pruning Competition on 3rd June, in the Vineyards of Messrs. J. Ingoldby and C. Elliott, and the orchard of Mr. Ron Nottage. The Committee appreciated the fact that 33 per cent. of the competitors were pruners who began pruning in the Junior Competitions conducted by this Branch for the past eleven years.

VINE SECTION.

Judges—Rods, Messrs. J. B. HARRIS and J. L. WILLIAMS; Spurs, Messrs. G. COX and H. H. ORCHARD; Currants—G. DOWDELL, H. HOWARD, and N. LOW.

Competitor.	Rod.	Spur.	Total.	Currants.
R. Sibley	95	94	189	—
B. Powell	96	89	185	—
D. Broughton	94	90	184	—
C. Sigston	94	87	181	96
A. Air	87	93	180	—
F. Price	93	87	180	—
W. Harris	90	89	179	—
C. Air	95	83	178	91
S. Penney	89	89	178	—
H. Eatts	95	82	177	95
Reg. Townsend	90	87	177	—
Ron. Elliott	89	87	176	91½
C. Cassitta	88	88	176	92
H. Baldock	94	81	175	—
C. Bruce	86	89	175	—
E. Waye	90	85	175	—
F. Schurgott	85	89	174	—
R. E. Elliott	94	80	174	—
Lin. Ward	90	84	174	95
Ron. Ward	90	83	173	—
Rex Ward	83	90	173	—
L. Osmond	86	87	173	—
J. Dowdell	91	82	173	92
F. M. Elliott	86	86	172	92
L. Penney	82	90	172	93½
K. Broughton	86	86	172	—
Ivan Dyer	87	85	172	91
W. Baldock	89	83	172	—
R. H. Sparrow	83	88	171	—
W. C. Ledgard	90	81	171	90½
R. Low	85	85	170	93½
A. Trembath	89	81	170	92
H. Storer	86	84	170	90½
Ralph Townsend	87	82	169	—
G. Ward	86	82	168	92
K. Robertson	84	84	168	—
Bick. Elliott	84	84	168	94
W. Osmonds	87	81	168	—
C. Robertson	82	85	167	—
R. Bilney	82	84	166	90½
D. Nicolle	80	82	162	—
C. Penney	76	85	161	95½
J. Franceschini	80	79	159	93
Wal. Ward	75	84	159	97
C. Sparrow	78	81	159	—
I. Bruce	71	78	149	79
P. Elliott	—	86	86	—
J. Johnson	—	81	81	—

R.A. AND H. SOCIETY TROPHY.

With a total of 189 points, Mr. R. Sibley of McLaren Vale wins the trophy presented by the Royal Agricultural and Horticultural Society for the competitor gaining the highest points in the Rod and Spur Sections.

FRUIT SECTIONS.

Judges—Messrs. R. FOWLER and E. LEISHMAN.

Competitor.	Prune.	Apricot.	Total.
B. Powell	90	91	181
R. Bilney	91	88	179
F. M. Elliott	89	90	179
J. Sigston	85	92	177
Bick. Elliott	88	89	177
A. Trembath	88	88	176
G. Ward	85	87	172
R. E. Elliott	89	82	171
Ralph Townsend	87	83	170
Ron. Ward	81	89	170
K. Robertson	81	87	168
L. Ward	79	84	163
F. Penney	82	81	163
W. C. Ledgard	80	80	160
R. Low	78	80	158

The following are the results of the Final Competition of the Three Years Apricot Tree Pruning for a trophy presented by the Branch to the competitor gaining the highest number of points over the three years:—

F. M. Elliott, 272; J. Sigston, 270; A. Trembath, 269; Reg. Elliott, 268; Bick Elliott, 260; B. Powell, 259; K. Robertson, 257; R. Low, 253; W. C. Ledgard, 251; L. Ward, 245; G. Ward, 244; F. Penney, 243.

Important Weeds of South Australia

[By G. H. CLARKE, B.Sc., Botanist, Waite Agricultural Research Institute, University of Adelaide.]

Nos. 23 and 24—(*Continued from page 808, April issue*).

The Control of Brassica Tournefortii.

Most writers on weed problems—and the present one is no exception to this—unconsciously address themselves primarily to the man whose holding is relatively, if not entirely, free from the particular weed under consideration. It is usual to stress the importance of early recognition, and of taking the necessary steps to prevent the plant from securing a foothold on clean land. They then proceed to deal with cases of larger infestation, and thus turn their attention, only secondarily, to the man whose property is perhaps completely overrun with the weed, and who, therefore, is most in need of guidance and help as well as of instruction as to his responsibilities to others. Now I think we might with advantage reverse this procedure in the present instance, and address ourselves first to those who are unfortunate enough to be seriously troubled with the Long-fruited Wild Turnip in a State in which it so far has only a localised distribution. It stands to reason that a farmer who is actually experiencing difficulty with a weed will be more alive to its dangers than others who, through lack of such experience, may be inclined to take a casual view of it. Furthermore, the man whose land is infested with this plant can do more towards preventing its spread to new areas than those who, in enjoyment of present immunity, may be slow to recognise as a new weed one which in appearance much resembles others not regarded with great concern.

As with the majority of annual weeds of cultivation which multiply rapidly from seed produced in large amounts, and easily dispersed, the complete eradication of *Brassica Tournefortii* will be almost impossible to achieve in situations where the plants have been allowed to grow and form seed for any extended period of time. Notwithstanding the destruction of innumerable seedlings with each cultivation, it is only to be expected that further seeds will germinate and new individuals appear with each subsequent rain. In other words, the problem will be one of control rather than of eradication in paddocks where the weed has become firmly established; but the control measures adopted must be combined with active steps to prevent it from spreading and being carried to other parts of the district and of the State.

Preliminary Measures.

If a crop has been badly infested with the weed during the previous year the stubble should be rolled and burnt as soon after harvesting as is permissible, and the same treatment should be applied to other weed-infested' lands. It is essential that every trace of the weed should be destroyed by burning, and this applies to the entire property including the roadsides and adjoining land, and not only to the larger paddocks. This, of course, will not prevent the subsequent appearance of new plants due to seed germination, but it is necessary for an infested holding to be made absolutely free of the weeds in any but the earliest stages of growth as a preliminary to a systematic programme of control. Odd plants must be sought out and destroyed, and every part of the property carefully inspected. It is not sufficient to dig or hoe them out; the plants must be either burnt *in situ* or collected in bags and burnt in heaps. Not that it is easy to burn them; it will probably be necessary in most cases to add straw, brushwood, etc., to the heaps in order to ensure complete combustion. The bags used for collecting must afterwards be soaked in boiling water for not less than five minutes in order to kill any seeds that may be clinging to them. Also, the sites of the rubbish heaps must henceforth be inspected from time to time so as to destroy any plants which have arisen from uninjured seeds.

Cultural Methods of Control.

Assuming, then, that the holding has been made temporarily free from the weed, the next step is to consider the cultural methods available for its control. At the outset it must be clearly understood that the presence of livestock will be necessary if these measures are to be successful. In districts where it is the usual practice bare fallowing with frequent working of the ground combined with heavy stocking with sheep during the fallow period is to be recommended. Unfortunately, however, the Wild Turnip has invaded districts in South Australia where other considerations make it undesirable to work the ground too frequently, and under these conditions heavy stocking with sheep affords the best means of keeping the weed in check while the land is not in crop. Though not ordinarily palatable to stock, sheep are stated to eat the Turnip while it is young, and especially if other feed is present at the same time. According to Mr. R. L. Griffiths there are some grounds for believing that the palatability of the weed to livestock can be raised by the use of superphosphate; accordingly, the sowing of the land to a pasture, say of Wimmera Rye Grass, and subsequent stocking with sheep throughout the year, is suggested in lieu of fallow if the land has been very badly infested.

According to Mr. G. L. Throssel, of the Western Australian Department of Agriculture, it is advisable to delay seeding operations until after the advent of the seeding rains, and to cultivate following these rains to a depth of about 2in. so as to destroy most of the weeds germinated without interfering with the consolidation. By delaying seeding for another week new plants which have appeared during the interim can be destroyed in the course of seeding operations.

When the crop is above ground it is inevitable that some weeds will be present, and, so long as they are not too numerous, it may be possible to get rid of most of them by hand-pulling or hoeing. This will necessitate going through the crop from time to time, and efforts should be made to eliminate the weeds before they have set seed. As already pointed out, the plants should be collected in bags and subsequently burnt. Owing to the risk of dissemination an infested crop should never be cut for hay, and, in any case, it is advisable during reaping to watch for and remove any weeds that have escaped detection earlier.

Treatment of Badly Infested Crops.

If the crop early shows signs of being badly infested with the Turnip there are only two courses of action that can be regarded as entirely satisfactory. One is to discontinue the growth of the crop for either grain or hay, and to turn in livestock and use it as a pasture. If stock cannot keep it down, the mower should be employed, or, in the last resort, it should be ploughed up. A crop badly contaminated with Wild Turnip constitutes a serious menace if allowed to go to seed because it is a potential source of distribution of the weed far and wide. The other alternative is to spray the entire crop, while still young, with a selective weed-killer, the cheapest and most suitable chemical for the purpose being, most probably, sulphuric acid.

Unfortunately, the sulphuric acid spray has not been developed to any great extent in Australia, and cannot as yet be employed here except on an experimental scale. But, in England and on parts of the Continent, especially France, the spraying of cereal crops with sulphuric acid is practised extensively for the destruction of Charlock and other Cruciferous weeds closely related, botanically, to *Brassica Tournefortii.* Apart from its effectiveness as a selective weed-killer for the purpose, sulphuric acid has the great advantage of cheapness; even in Australia the cost for materials should not exceed 10s. to 15s. per acre, which is considerably less than that of most commercial weedicides. Moreover, it acts rapidly, does not dry up, and is not greatly dependent upon weather conditions. On the other hand, its use requires acid-proof spray equipment, and calls for a certain amount of team organization and experience in the handling and mixing of the acid and its application.

Precautionary Measures.

The most painstaking efforts to control the Wild Turnip on crop lands are not likely to be successful unless equally conscientious efforts are made to prevent its growth on other parts of the holding and its spread to other situations. The destruction of isolated plants is imperative wherever they are found, and it is important to enlist the help of neighbouring farmers and local government authorities to prevent the growth and spread of the weed along roadsides and on adjoining property. It is necessary to be continually on the watch for the plants, and regular inspections must be made of all situations where they are likely to occur. Along fence lines and in certain other situations it may be advantageous to use chemical weed-killers, such as coarse salt, or sprays of sodium chlorate or sulphuric acid.

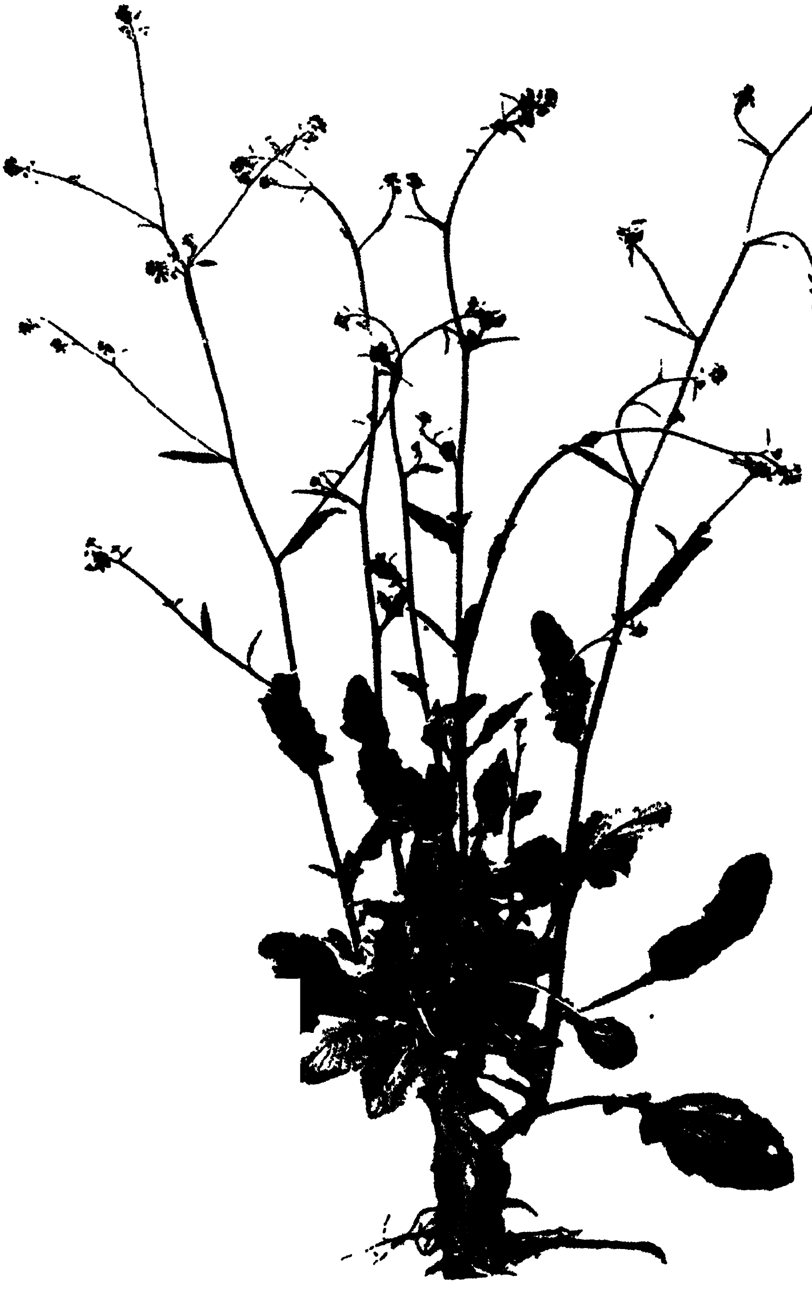
Just as a man suffering from an infectious fever should not mingle indiscriminately with his fellows, so the owner of a property infested with Wild Turnip owes a like duty towards his neighbours. He should refrain from despatching to them farm produce or other goods likely to be contaminated with weed seeds without taking steps to see that such materials will not be a source of weed invasion elsewhere. Among the measures that should be adopted we may mention as being of particular importance the careful cleaning of all agricultural machinery and vehicles used in weed-infested paddocks, and the exercise of care in transferring livestock, and especially horses, from one situation or paddock to another. Animals should not be removed direct from a weedy paddock to a clean one, but they should be kept for at least a week in a small compound maintained strictly free from the weed growth so as to allow of evacuation of weed seeds previously ingested, and then moved to the desired situations.

Another measure advised by Mr. Throssel is the provision of windbreaks. or strips of scrub or trees about 30ft. wide inside the boundary fences, so as to form a barrier to the spread of old plants which tend to break off and be rolled along the ground by wind action. Such strips of scrub are much more effective in this respect than fences, and are also valuable as a means of checking soil drift.

THE SHORT-FRUITED WILD TURNIP.

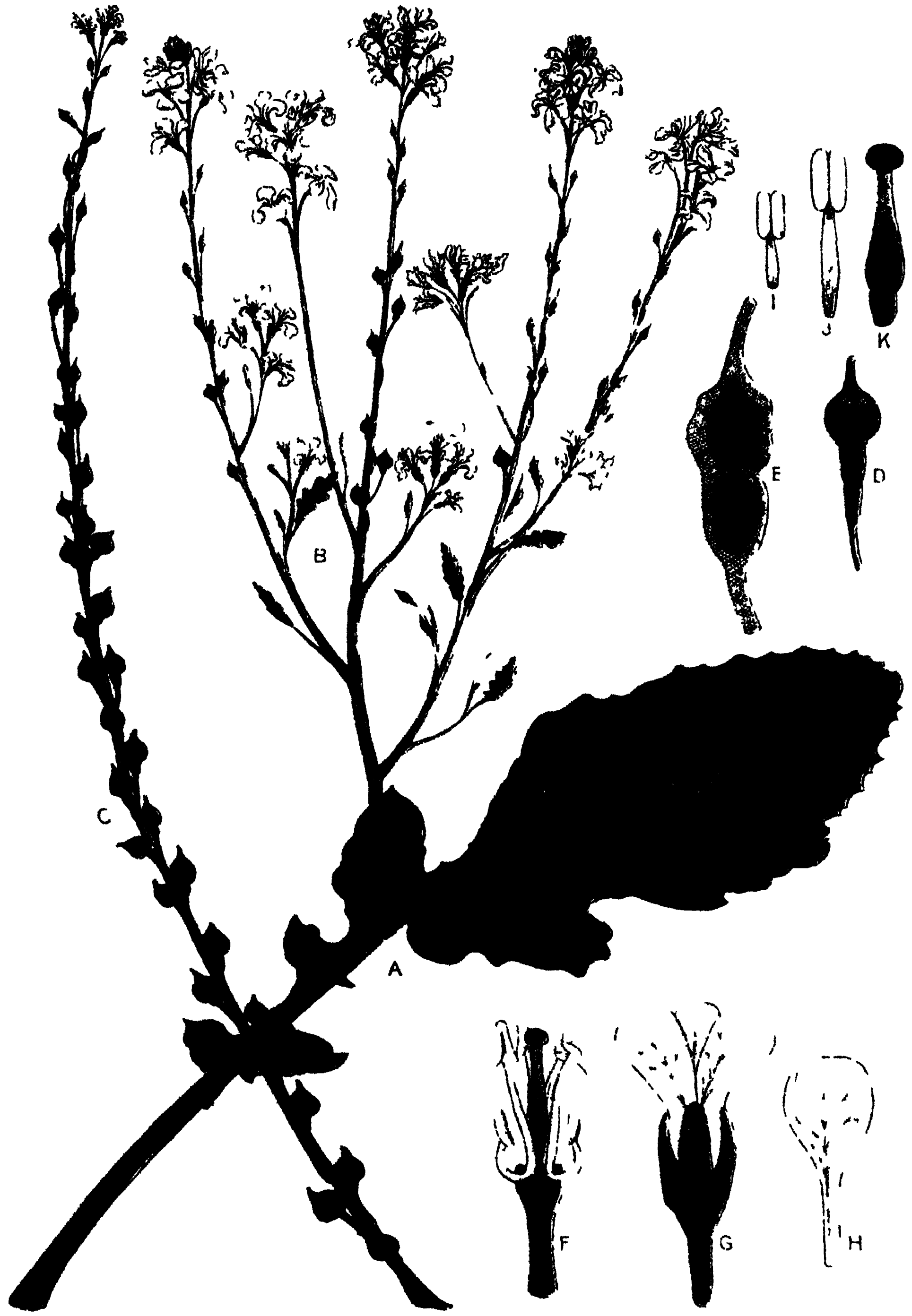
Rapistrum rugosum, All.

This is a weed of much the same type and habit of growth as *Brassica Tournefortii* from which, however, it is readily distinguishable by having short, two-jointed, seed pods, and less regularly divided radical leaves each with a large terminal lobe. The stem leaves, though small in comparison with the basal ones, are larger and more conspicuous than in the Long-fruited plant, so that the branching stems do not present quite the same bare appearance as is characteristic of older plants of *Brassica Tournefortii*. The root system also is different, being more irregularly branched, tougher, and more fibrous than in the latter, in which there is a swollen crown continuous with a long slender taproot from which the plant breaks away when mature. Unlike *Brassica Tournefortii*, which prefers light sandy soils, *Rapistrum* occurs chiefly on the heavier wheat-growing soils of the Lower and Middle North, but it has long been established in many parts of the State, and most farmers will probably have had some experience of it.



[See coloured plate opposite.

Single Plant of Short-Fruited Wild Turnip (*Rapistrum rugosum*), All.



• SHORT FRUITED WILD TURNIP (*Rapistrum rugosum*, All.)

A.—Leaf (about half natural size.) B.—Upper part of inflorescence. C.—Older branch with fruits attached. D.—Mature Fruit. E.—Fruit in longitudinal section showing seeds in position. (enlarged). F.—Flowers with sepals and petals removed. G.—Single flower. H.—Petal. I.—Short stamen. J.—Long stamen. K.—Pistil.

Botanical Characters and Classification.

Rapistrum is a relatively small genus and derives its name indirectly from from the Latin *rapa,* a turnip. The most widely distributed species is the one under consideration, viz., *R. rugosum,* characterised by having *rugose* or "wrinkled" terminal segments to the seed pods. It is a native of Central and Southern Europe, but is now widely distributed. The following is the description given of the plant by Mr. J. M. Black in the Flora of South Australia:—

> An erect branching annual, often over 1 metre high, more or less beset with short, stiff hairs; lower leaves large, lyrate, the upper ones usually sessile, lanceolate, toothed; sepals 5 mm. long, the two outer ones pouched at the base; petals pale-yellow, twice as long; fruiting racemes long, the pedicels almost erect, shorter than the pods, which are 6-7 mm. long (without the beak), consisting of two small hard indehiscent articles, the upper globular, wrinkled, with 1 erect seed, the lower article cylindrical, with or without 1 pendulous seed; style forming a conspicuous beak; cotyledons conduplicate. Flowering: October-December.

Characters as a Weed.

Though frequently found on uncultivated ground, *Rapistrum rugosum,* like *Brassica Tournefortii,* is mainly an annual weed of cereal crops, and owes its troublesomeness to its vigorous multiplication from seed and ability to smother and compete successfully with the cereal plants. It is extremely difficult to grow clean crops on land that has become badly infested with it. Apart from the weakening effect on the crop due to competition the plant is a source of great difficulty at harvest time owing to the toughness of its stems which are not easily cut with a binder, and its tendency to choke the grain harvesting machinery.

It spreads by the same agencies as those responsible for that of the Long-fruited Turnip, except that, unlike the latter, the plants to not tend to snap off at the ground level and to roll, tumble-weed fashion, along the ground. Apart from this difference, however, the weed is very similar in characters and behaviour to the long-fruited species.

Control and Eradication.

What has been said above in regard to the control of *Brassica Tournefortii* applies equally well to *Rapistrum rugosum.* It is worthy of note, however, that whereas the first is at present confined to the Mallee farms, the second is most troublesome in the Lower Northern areas where bare fallowing is practised and where the danger of soil erosion is not so great as to forbid frequent cultivations during the fallow period. In order to destroy the plants effectively cultivators with wide-winged blades should be used, and, as Mr. Worsley Johnston has pointed out, a week of fine weather following the cultivation will contribute much towards the success of the operation owing to the ability of the plants to re-establish themselves if the soil is moist. As in the case of *Brassica,* heavy stocking with sheep will be of great assistance in keeping the fallows clean, but, it must be remembered that, like many other Cruciferous weeds, both *Rapistrum* and *Brassica* will taint the meat of ration sheep, and the milk of dairy cows which have been feeding upon them.

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The Fertilization of Citrus Trees

A Paper read at the Conference of River Murray Branches of the Agricultural Bureau, held at Berri on 16th June, 1938

[F. R. ARNDT (Horticultural Adviser for the Upper Murray District).]

As is the case with other varieties of plants, the substances that citrus trees need to carry on their existence are air, water, phosphoric acid, potash, lime, and to a lesser degree such minerals as magnesium, iron, sulphur, manganese, zinc, copper, etc.

Air is, of course, plentiful and free to all, but it is the only requisite of plant life that is. Water is a most important factor in the development of the plant, the greater portion of the living plant consisting of water. Water, moreover, by dissolving the plant foods contained in the soil, reduces these to a condition in which they can be easily absorbed by the roots of the plants. The action of water in making available large quantities of plant food is the chief reason for the increased fertility shown by soils in arid areas when they are irrigated.

Water, then, is the first requisite that must be added to the soil to promote plant growth, and as citrus trees require more moisture than do most other varieties of fruit trees, the first essential to successful citrus culture is an ample rainfall, or where this does not exist, then the land must be supplied with sufficient water by means of irrigation.

Of the various mineral ingredients contained in the soil phosphoric acid, potash, nitrogen, and lime are the ones taken up in the greatest quantities by the various plant varieties, including citrus trees, and as the consequent removal of these plant foods from the land through cropping will, in time, lead to the impoverishment of the soil, these substances must be replaced if the land is to remain in a fertile condition.

Humus.

Besides their mineral ingredients practically all soils contain a greater or less amount of decayed organic matter, or humus, which is especially the case with virgin lands, which in their natural state are covered with forest, shrubs, or grasses. Humus, consisting of the elements, drawn from the air and soil, and having formed the substance of organic beings, is naturally rich in the ingredients required for plant life. A soil well supplied with humus is therefore a fertile one, and few of the higher classes of plants will thrive if humus is deficient in the soil.

Humus, moreover, is the home of the nitrifying soil bacteria. These bacteria have the property of taking up the nitrogen from the air that penetrates the soil into their own bodies, and thereby increasing the nitrate content of the soil.

The desirability of having a good supply of humus in the soil of the citrus orchard is therefore apparent.

Manurial Practices in Past Years.

For many years the fertilization of the citrus grove was, to a great extent, a matter of guesswork, and a variety of manurial practices was practised by citrus growers. When considerable quantities of organic matter—generally applied in the form of stable manure—were given to the trees, fairly good results were generally obtained; but the application of phosphatic or potassic fertilizers by themselves, or with small quantities of nitrogen very often gave only indifferent results.

In later years growers in applying larger quanties of nitrogen—often together with heavier dressings of other chemical fertilizers as well, generally found that the trees so treated made more vigorous growth and bore better crops than formerly, but were often at a loss as to which of the fertilizers the beneficial results so obtained were chiefly due.

It was not until the subject of the fertilization of citrus was thoroughly investigated at scientific research stations, chiefly in the United States of America and in Australia that the great value of nitrogen as a citrus fertilizer was definitely established, and the the manuring of citrus trees placed on a sound basis.

Watering by semi-flooding.

Citrus Fertilizers Trials at the State Experimental Orchard at Berri.

To test the value of various kinds of fertilizers in relation to citrus trees a series of manurial experiments was commenced at the Berri Experimental Orchard in 1920 with trees planted in 1911, and these trials, with some modifications, are still being continued.

These experiments have definitely demonstrated the overwhelming importance of nitrogen as a fertilizer for citrus trees, either by itself, or in conjunction with other fertilizers.

The land upon which trees utilised in these experiments are planted consists of a light, deep, red sandy loam, typical of much of the soils of the Murray upland slopes, and has been classed as "Murray Land" in the C.S. anl I.R. Soil Survey of the Berri area.

The trees given over to these experiments are, with the exception of some off-type navels situated in the superphosphate fertilizer plot, of the Washington navel variety, and are planted at the rate of 99 to the acre.

The fertilizers were applied in two dressings, half quantity in spring and the other half in late summer. The first records in regard to yields were taken in 1921.

In the following tables the average annual acreage yields of the various fertilizer plots have been worked out from the data supplied by the manager of the Berri Experimental Orchard, Mr. O. E. Halliday, on the basis of 48lbs. to 1bush. of fruit.

The results herein given have been compiled from the records taken up to the end of the 1937 season, and include a considerable amount of data that has not been previously published.

Each separate test has been confined to one row, or part of a row of orange trees, the rows running in the direction that the trees are watered.

Sulphate of Ammonia Fertilizer Tests.

The following are the records of the sulphate of ammonia fertilizer tests for the past 17 years:—

Sulphate of Ammonia Tests.

Row Number.	Number of Trees in Test.	Quantities of Fertilizer Applied per Acre.	Average Annual Yield in Bushels per Acre, 48lbs. = 1 Bushel.	
			Years 1921-1929, inclusive.	Years 1921-1937, inclusive.
		cwt.		
3..............	16	1	69	137
4..............	16	2	103	138
5..............	16	3	192	228
6..............	16	4½	218	264
7..............	17	5	212	248
8..............	17	2½	186	206
9..............	17	No fertilizer	60	39

From the above figures it will be seen that with the exception of the no fertilizer plot, which showed a decline, all of the other sections increased their average annual production over the whole of the 17 year period of the experiment compared to that of the first nine years, which was, in great measure, probably due to the trees attaining greater age.

In these experiments no cover crops were grown among the trees or any organic fertilizers or other humus forming materials brought on to the land.

Sulphate of Potash Tests.

The records of the sulphate of potash tests for the nine years, 1921 to 1929 inclusive, are as follows:—

Sulphate of Potash Fertilizer Tests.

Row Number.	Number of Trees in Test.	Quantities of Fertilizer Applied per Acre.	Average Annual Yield per Acre in Bushels, 48lbs. = 1 Bushel, Years 1921-1929, inclusive.
		cwt.	
10 .	16	1	46
11 .	17	2	101
12 .	16	3½	52
13 .	16	5	64
14 .	17	2½	32

It will be observed that there is a considerable difference in the production of the various tree rows, no doubt due to one or more of several factors, such as variations in soil conditions, situation, or hereditary differences in the trees themselves, and the low average yields of rows 10 and 14 may at least in part, be accounted for by the fact that the former is situated next to a "no manure" row, and to the latter being located alongside a row of almond trees.

In comparing the average annual acreage yields of the sulphate of ammonia and sulphate of potash plots with each other these show that those of the former are about two and three quarter times as great as those of the latter; and even if Rows 10 and 14 are excluded from the calculations owing to their rather unfavourable situation, the average annual yield from the sulphate of ammonia plot for the nine year period of the experiment is still more than twice that produced by the three remaining rows fertilized with sulphate of potash.

The exclusive use of potash had not been continued for more than a few years when there were indications that this fertilizer treatment was detrimental to the welfare of the trees. This became more and more apparent as time went on, the trees year by year decreasing in vigour, colour of foliage and productiveness.

At the end of nine years the health of the trees had declined to such an extent that the colour of their foliage had changed to a distinct yellowish shade, while such new growth as was made was weak and stunted.

The decline in the productivity of the trees during this period was likewise great, and had decreased to an average of 22bush. per acre for the whole plot for the ninth year of the experiment.

The trees by this time had become so unthrifty that it was apparent that no further demonstration was needed to prove that potash by itself was unsuited for the successful culture of citrus trees (at least as far as conditions at the Berri Experimental Orchard were concerned) and it was decided to discontinue the experiments in that form, and by the addition of nitrogen to the fertilizer programme to carry out a new series of tests.

The six weakest of the trees, which were situated at the beginning of the irrigation runs, were excluded from these new series of experiments, as being too weak and stunted for further experimental work, but were still fertilized with potash, while another 21 trees were utilised in barrier rows. The remaining 55 trees were still given the same quantities of sulphate of potash as formerly, but were in addition supplied with nitrogenous fertilizers.

Results of Trials with Mixtures of Potassic and Nitrogenous Fertilizers.

In the new trials each test row was divided into two portions, consisting of five and six trees each respectively, and each such section was fertilized either with 5cwt. of sulphate of ammonia or with 7¾cwt. of blood manure, besides receiving the same quantities of sulphate of potash as formerly.

These tests had not been in progress for more than a few years before a wonderful recovery was made by the trees, both in general health and in productiveness, and they soon attained the characteristics of normal, well-grown orange trees.

For the eight year period that these new trials have now been in progress, the average annual acreage yields have been slightly better than those obtained in the sulphate of ammonia tests, while when compared with those secured when only potash was used, the records show an annual average acreage production almost four times as great.

The production records of the potash-nitrogen experiments are shown in the following table compared with the results obtained from the use of potash only.

Tests with Sulphate of Potash and Nitrogenous Fertilizers.

Row Number.	Number of Trees in Test.	Quantities of Fertilizers Applied per Acre.	Average Annual Yield per Acre in Bushel Cases, 48lbs. = 1 Bushel.	
			Mixed Fertilizers, Years 1930-1937.	Potash Only, Years 1921-1929.
Part 10	5	1cwt. sulphate of potash, 7¾cwt. blood manure	77	46
Part 10	6	1cwt. sulphate of potash, 5cwt. sulphate of ammonia	177	46
Part 11	5	2cwt. sulphate of potash, 7¾cwt. blood manure	241	101
Part 11	6	2cwt. sulphate of potash, 5cwt. sulphate of ammonia	402	101
Part 12	5	3½cwt. sulphate of potash, 7¾cwt. blood manure	284	52
Part 12	6	3½cwt. sulphate of potash, 5cwt. sulphate of ammonia	238	52
Part 13	5	5cwt. sulphate of potash, 7¾cwt. blood manure	236	64
Part 13	6	5cwt. sulphate of potash, 5cwt. sulphate of ammonia	269	64
Part 14	5	2½cwt. sulphate of potash, 7¾cwt. blood manure	222	32
Part 14	6	2½cwt. sulphate of potash, 5cwt. sulphate of ammonia	168	32

Tests with Superphosphate.

Another series of trials regarding the productivity of orange trees was carried out by applying various quantities of superphosphate to different rows of trees.

As previously mentioned the plot given over to these experiments comprises a considerable number of off-type navel trees, which, however, are fairly evenly distributed over the various tree rows with the exception of Row 8, which consists entirely of good type navels, and so has here been omitted from these records as not yielding a fair basis of comparison with the other trees.

The land occupied by these trees is, with the exception of Rows 7, 9 and 10, hardly first class citrus land, and this, combined with the fact that many of the trees are not of the true Washington navel type, probably accounts for their low production during the 8 year period that these experiments were in progress.

The following are the records of these fertilizer experiments for the years 1921 to 1928, inclusive:—

Superphosphate Tests (Strength of Fertilizer=36% Superphosphate).

Row Number.	Number of Trees in Test.	Quantities of Fertilizer Applied per Acre.	Average Annual Yield per Acre in Bushel Cases 48lbs. = 1 Bushel, Years 1921-1928, inclusive.
		cwt.	
1	9	1½	33
2	9	3	16
3	10	4½	25
4	10	6	28
5	10	8	37
6	10	10	23
7	9	5	90
9	10	6	92
10	10	12	93

The above figures show an exceedingly low rate of production, even when allowance is made for the type of the trees and the nature of the soil, and seem clearly to indicate that the application of superphosphate by itself is a most unsatisfactory fertilizer programme to follow in the manuring of citrus trees.

As was the case with the trees that were fertilized exclusively with potash, the trees on this plot also decreased in vigour and the colour of their foliage yellowed as time went on, but not quite to the same extent as those treated with potash alone.

Tests with Superphosphate and Nitrogenous Fertilizers.

After these experiments had been carried on for eight years it was apparent that the unsuitability of superphosphate as a sole fertilizer for citrus trees had been amply demonstrated. The trials were accordingly discontinued in their original form, and in 1930 were modified to include sulphate of ammonia and stable manure in addition to to superphosphate,

In these new experiments the Rows 2, 4, 6 and 10 were utilized for the fertilizer trials, and the intervening rows used as barrier rows. Each fertilizer row was divided into two sections, with a barrier tree separating the sections, and in addition to superphosphate were fertilized either with sulphate of ammonia or stable manure.

The results of these experiments compared with those of the same test rows when these were fertilized with superphosphate only, are as follows:

Tests with 36 per cent. Superphosphate, Sulphate of Ammonia, and Stable Manure.

Row Number.	Number of Trees in Test.	Quantities of Fertilizers Applied per Acre.	Average Annual Yield per Acre in Bushels, 48lbs. = 1 Bushel.	
			Mixed Fertilizers, Years 1930-1937.	Superphosphate Only, Years 1921-1928.
Part 2	3	3cwt. superphosphate, 15 tons stable manure	99	16
Part 2*a*	4	3cwt. superphosphate, 5cwt. sulphate of ammonia	175	16
Part 4	4	6cwt. superphosphate, 15 tons stable manure	328	28
Part 4*a*	4	6cwt. superphosphate, 5cwt. sulphate of ammonia	176	28
Part 6	3	10cwt. superphosphate, 15 tons stable manure	216	23
Part 6*a*	4	10cwt. superphosphate, 5cwt. sulphate of ammonia	283	23
Part 10	4	12cwt. superphosphate, 15 tons stable manure	390	93
Part 10*a*	4	12cwt. superphosphate, 5cwt. sulphate of ammonia	410	93

Little further comment is necessary upon this series of experiments, as the figures speak for themselves. The results obtained by the application of either sulphate of ammonia or stable manure are most striking and show that the yields per row were thereby increased from more than four to twelve times of those obtained when only superphosphate was used.

Net Results of Berri Citrus Fertilizer Tests.

The results obtained in the citrus fertilizer trials of the Berri Experimental Orchard clearly show that nitrogen is a major limiting factor in citrus production, and that the application of potash and superphosphate by themselves is quite insufficient to provide the trees with the requirements necessary for their successful development.

Bulky organic fertilizers have only been used in connection with the four test rows in the reconstructed superphosphate plot, where stable manure, in addition to superphosphate, was applied; and for the eight-year period that these trials have now been going on the production of the trees under this test has been practically the same as those obtained from the adjacent test rows where sulphate of ammonia was used in conjunction with superphosphate.

There are indications, however, that on some of the fertilizer plots, which have now been under clean cultivation for over 20 years, that the original supply of humus in the soil has greatly diminished, and that the trees would benefit by the addition of bulky organic fertilizers to the land.

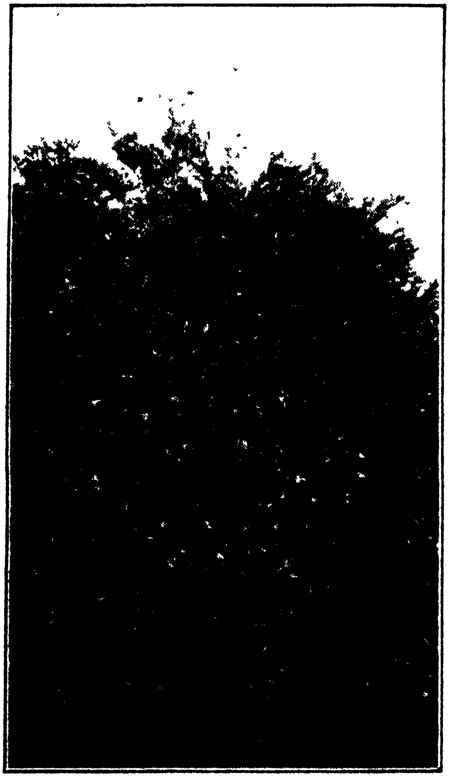
Californian Experiments.

Extensive experiments in the fertilization of citrus trees have been carried on in California for a number of years on various experimental stations.

The results generally coincide with these obtained at Berri, but the experiments have been carried out on a much more extensive scale.

As at Berri, the Californian researches show that nitrogen is the limiting factor in citrus production, and that potassic and phosphatic fertilizers by themselves, or together, are of little use in promoting the productivity of citrus trees.

Considerable experimental work has also been done with organic fertilizers in bulky form, such as barnyard manure, lucerne-straw, or cover crops, and these have generally given better results than when only concentrated nitrogenous fertilizers have been used, but a mixture of these two kinds of fertilizers has been found to be most effective with trees in full bearing.



The Californian researches indicate that citrus trees in full bearing under average conditions require from 2 to 3lbs. of nitrogen per tree per year, half of which should be supplied from bulky organic sources and the other half from chemical concentrates.

Cover Crops.

Whether the growing of cover crops among citrus trees is advisable or not is a matter that has often exercised the minds of many citrus growers.

With deciduous fruit trees and vines, which are dormant during winter, and which consequently take but little moisture from the soil at this time of the year, cover crops can be grown amongst these without causing them to suffer any ill effects from want of moisture; but with citrus trees the case is different, as these require that the land should be kept fairly moist during this period to enable them to fill out their fruit and to replenish the moisture lost by transpiration through their foliage.

Owing to the dry climatic conditions generally prevailing in the Murray districts, cover crops cannot be successfully grown in a normal season, even among deciduous trees and vines, without an autumn or winter irrigation, but in the case of citrus trees more waterings than this are often necessary, which makes the growing of cover crops a more costly one.

There can be little doubt that among young trees the practice is a beneficial one, as the tree roots are not, as yet, in full possession of all of the land, and the cover crops consequently do not compete unduly with the trees for plant food and moisture.

With older trees, however, from 10 to 12 years of age and onwards, the case is different, as these require more moisture than younger trees to carry on their normal functions, and the growing of cover crops among them may, in the absence of heavy rains or frequent waterings, dry out the soil to such an extent as to detrimentally affect the health and vigour of the trees.

Other disadvantages in the growing of cover crops among full grown citrus trees include—the detrimental effect of excessive shade, which often prevents the satisfactory development of the crops, even when the soil is well supplied with moisture; the inconvenience caused by the work necessary for the irrigation of the trees while the harvesting of the fruit is in progress; and the damage that may be done to the crops by the pickers when moving around and between the trees during harvesting operations.

Bulky Organic Manures.

Owing to the difficulties experienced in the growing of satisfactory cover crops the most effective way in which to supply full grown citrus trees with humus and other fertilizing substances from organic sources is by bringing bulky organic manures on to the land.

These may consist of various kinds of animal manures, and of materials of vegetable origin, such as lucerne, bean straw, wheaten straw, and of other products of plant life.

The manurial value of the different organic substances varies considerably, especially in nitrogenous content, and allowances must be made for this in the fertilization of the citrus grove.

From information supplied by Mr. C. S. Piper, chemist of the Waite Agricultural Research Institute, several years ago, it appears that the nitrogen in one ton of air dry tops of the kinds of the leguminous plants here mentioned is as follows:—Beans, 80lbs.; tares, 58lbs.; peas, 54lbs.; and lucerne, 53lbs. To express these amounts of nitrogen in terms of sulphate of ammonia, it is necessary to multiply by 5—sulphate of ammonia containing approximately 20 per cent of nitrogen. Therefore the nitrogenous content of 1 ton of these dry plant substances is, in the case of beans, equal to 400lbs. of sulphate of ammonia, tares, 290lbs., peas, 270lbs., and lucerne, 265lbs. of that fertilizer.

Stable Manure.

The manurial value of stable manure, which is the fertilizer of bulky organic form most often applied to citrus trees, has been variously computed to contain from 8 to 15lbs. of nitrogen, 6 to 12lbs. of potash, and 6 to 7lbs. of phosphoric acid per ton, the differences in these fertilizing properties being partly due to the nature of the fodders that the animals have been fed on, and partly to the condition of the manure when used.

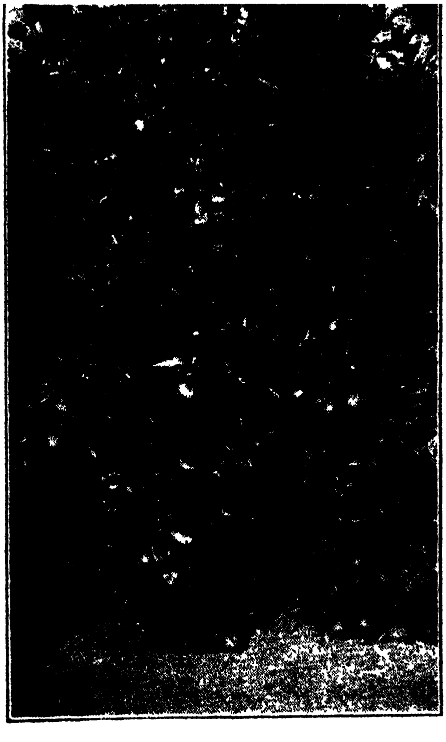
Stable manure is generally applied to the land in a partly rotted form, but in the process of storing, carting and spreading often dries out considerably, with the consequent loss of some of the nitrogen in the form of ammonia.

If the nitrogenous content of manure at the time of ploughing in be computed to be one-half one per cent., then one ton of stable manure will contain about 11lbs. of nitrogen, which is equivalent to almost ½cwt. of sulphate of ammonia, and if 10 tons be applied per acre (which may be considered a serviceable dressing), then the land will be enriched with nitrogen equal to that supplied by about 5cwt. of sulphate of ammonia.

In addition to its nitrogenous content, the application of 10 tons of stable manure of average quality will supply phosphoric acid roughly equal to that contained in about 3cwt. of superphospate, and potash equal to about 1½cwt. sulphate of potash. Besides its direct manurial value, stable manure, in common with other bulky organic fertilizers when applied to the land, promotes conditions favourable for the development of the nitrifying soil bacteria, and in addition has the property of improving the physical texture of the soil and increasing the water holding capacity.

Balanced Fertilizer Programme.

As nitrogen is the chief limiting factor in citrus production it is the fertilizer that has first of all to be taken into account when the fertilization of the citrus grove is being considered.



Allowing for 100 trees to the acre (which may be considered the average planting in the irrigation areas), and that the minimum requirement of nitrogen is 2lbs. per annum per tree in full bearing, then if half of this is to be supplied from bulky organic sources and half from concentrates, this may be obtained by the application of 9 tons of stable manure and 4½cwt. of sulphate of ammonia. If it is desired to increase the supply of nitrogen to 3lbs. per tree the quantities of the above fertilizers must be increased by 50 per cent., but this should only be necessary with very large trees.

Where such large quantities of stable manure or other organic substances are difficult or costly to obtain, the greater portion of the nitrogen required by the trees must be obtained from chemical concentrates; but organic matter should be applied to the land whenever possible to keep up the fertility of the soil and the health of the trees.

As the Berri fertilizer trials tend to show that the application of nitrogen with either potash or superphosphate has given better results than those obtained from the use of nitrogen alone, it is advisable that these latter fertilizers should also be used if organic manures are not freely applied, but heavy dressings should not be necessary, and the application of about 3cwt. of superphosphate annually, and from 1 to 2cwt. of sulphate of potash every second year should be sufficient on most plantations. The importance of phosphoric acid and potash is at present under investigation.

For young trees not in bearing heavy applications of fertilizer should not be needed. Cover crops of peas or beans should supply most of the fertilizer they require, but light dressings of sulphate of ammonia at the rate of 1 to 2cwt. per acre may also be helpful at times. Where cover crops are not grown moderate dressings of stable manure or other organic matter should be applied to the land.

Time and Methods of Application.

The best time to apply the greater portion of the fertilizer required for citrus trees is in late winter or early spring before the trees have commenced

their new season's growth, so that it may be readily available for the production of new foliage and help in the flowering and setting of the fruit.

Stable, or other bulky manures, should be applied during the winter and ploughed in, so that they rot very quickly and their plant foods become available to the trees during spring and early summer. Such manures can either be distributed broadcast over the whole of the land before it is ploughed, or spread in one or more deep furrows along each tree row and then ploughed in. Compared with the one furrow method of application, broadcasting will result in a more even distribution of the roots of the trees, promote bacterial activity, and improve the texture of the soil, over a wider area, but where the manure is put into two or more furrows more uniform soil conditions will be established than when only one is used, and the tree roots will consequently not be so closely crowded together in obtaining their food supply.

The superphosphate, potash, and about half of the nitrogen concentrates should be applied just prior to or after the first irrigation in spring. The remainder of the nitrogen concentrates may be used in two equal dressings during December and February, or may be utilized by being applied in smaller quantities at each irrigation.

The concentrated fertilizers may be applied either by broadcasting and ploughing under, by scattering along the bottom of plough furrows, or by drilling with an orchard manure sower.

Broadcasting, although theoretically the best way to apply fertilizers, as every portion of the orchard if thereby evenly supplied, is in practice, not always the most satisfactory method, for unless the land is very deeply ploughed and the manure turned well under, much of it will be placed too shallow for the roots to readily come in contact with it. This is especially the case with superphosphate, which does not leach very deeply nor spread very far from where it has been placed, even under irrigation conditions, and should consequently be put down deeply into the soil.

Concentrated fertilizers, to give best results, should act fairly quickly, and in this respect are different from bulky organic manures, which render available their fertilizing properties much more slowly: therefore if they are distributed by means of either manure sowers or by being placed at the bottom of plough furrows, they are put more deeply into the soil and so become more quickly available to the trees.

Parafield Egg-Laying Competition, 1937-38

The supplement to this issue is a comprehensive report of the Single Test Egg-Laying Competition held at Parafield Poultry Station from 1st April, 1937, to 31st March, 1938. The Chief Poultry Adviser (Mr. C. F. Anderson) in the report states that entries for 401 birds were received. Two extra sections were provided in this competition, one for Light Sussex for which entries for 33 birds were received, and a section for the Soaked Grain method of feeding, for which 30 birds were entered. The highest score of first grade eggs in the competition was 258 laid by a White Leghorn pullet entered in the Home Project Utility Section by Master R. Johnson of Two Wells.

In the general summary of results it is shown—

1. That the average cost of food per bird for the 12 months was 7s. 5.6d.
2. That the average return per bird over cost of feeding was 18s. 8.6d.
3. That the average number of eggs laid by all birds in the test was 187.6.
4. Return over cost of feeding was 11s. 3d. per bird.

Citrus Industry

Advice on the Picking, Handling and Packing of Oranges intended for Export to New Zealand

[Issued by the Australian Citrus Advisory Council.]

1. Picking of Fruit.

The fruit must be clipped from the trees preferably by means of a blunt-nosed clipper. No protruding stems should be left on the fruit, and where necessary a second cutting in order to remove superfluous wood should be made. The fruit should be placed gently, *not dropped,* in the picking box.

2. Handling of Fruit.

Throughout the whole of the operations from the picking of the fruit to the wrapping and packing *gloves* should be worn. *Misshapen,* or excessively corrugated fruit shall not be shipped.

3. Pre-Cooling.

Wherever possible all fruit shipped should not exceed a temperature of 53deg. at the time of loading, and every effort should be made to comply with this requirement.

4. Grading.

Oranges shall comply with the following provisions:—

(*a*) The outer layer or shown surfaces of the oranges shall be a true indication of the contents of each box.

(*b*) Each box shall contain one variety of orange only.

(*c*) No orange intended for shipment to New Zealand shall measure less than 2in. in diameter.

(*d*) The oranges shall not be dry. They shall be mature, of normal shape, and appearance common to the variety, sound, and of reasonably even colour, and shall have been clipped from the tree.

> "Dry" means that the proportion of juice extractable is less than 35 per cent. by weight of the whole orange. In order to ascertain the proportion of juice extractable from an orange, the halves of a freshly divided orange shall be rotated upon a conical glass lemon-squeezer under hand pressure only. The resultant juice shall be strained through a strainer of not less than 30 meshes to the lineal inch.
>
> "Mature" means that the fruit shall be in such condition that the quantity of N/10 soda solution required to neutralise the acidity content of 10 cubic centimetres of juice drawn from the mixed juices of not less than five oranges taken at random from any case or cases bearing a similar mark shall not be more than 26 cubic centimetres.

(*e*) Oranges shall be packed in either of three grades, namely, "special," "standard," or "good."

(*f*) Oranges described as *"special"* shall consist of oranges complying with the requirements of paragraph (*d*) above, and in addition shall be substantially free from disfigurements such as are caused by scars, scratches of the skin, excessive navel segments, cavities, punctures and blemishes caused by any insect or fungus pest. Such disfigurements shall not exceed 2½ per centum of the total surface area of any individual orange.

(*g*) Oranges described as *"standard"* shall consist of oranges complying with the requirements of paragraph (*d*) above, but disfigurements such as caused by scars, scratches of the skin, excessive navel segments, cavities, punctures and blemishes due to any fungus or insect pest may be allowed to the extent of 10 per centum of the total surface area of any individual orange.

(*h*) Oranges exported to New Zealand and described as "*good*" shall consist of oranges complying with the requirements of paragraph (*d*) above, but disfigurements such as are caused by scars, scratches of the skin, excessive navel segments, cavities, punctures and blemishes due to any fungus or insect pest may be allowed to the extent of 25 per centum of the total surface area of any individual orange.

(*i*) Oranges shall not be exported unless they have been sweated prior to packing for a period of at least seven days.

5. Packing.

The fruit shall be packed in clean, new boxes or trays manufactured from seasoned softwood or hardwood containing not more than 25 per centum of moisture, smoothly sawn or dressed in a manner approved by the secretary, and, in the opinion of the secretary, sufficiently strong to withstand such handling as is ordinarily incidental to transport to destinations beyond the Commonwealth. The outside edges of boxes must, where necessary, be trimmed in a manner approved by the secretary. Boxes manufactured from kauri and jarrah timber shall have the boards comprising the ends, tops, and bottoms dressed on one side at least, and the boards comprising the sides shall be smoothly sawn or dressed. The dimensions of the cases shall be as under:—

CITRUS BOXES.

Inside measurements (clear of divisions).

	In.
Length	24
Depth	11½
Width	11½

The timber used in the construction of citrus boxes shall, if softwood, comply with the following specifications:—

Citrus Box.

(*a*) Each end shall measure 11½in. by 11½in. by 11/16in.

(*b*) Each centre board shall measure 11½in. by 11½in. or 12in. by 11/16in.

(*c*) Each side and the bottom shall be composed of two or three boards, each of which shall measure 26 1/16in. by ¼in. by 5¼in. when two boards are used, and 26 1/16in. by ¼in. by 3⅜in. when three boards are used.

(*d*) The top shall consist of two, three, or four boards, each 26 5/16in. long and 3/16in. thick, which shall be securely fastened at each end to a cleat before the top is nailed to the box. Each cleat shall measure 11½in. by 1in. by ⅜in.

(*e*) An aperture ½in. wide shall be be allowed between boards comprising the sides, bottom, and top.

(*f*) The inside top edges of the sides, end, and centre board shall be chamfered.

(*g*) The boxes shall be wired at each end against the inside edge of the cleat with the twitch on the side of the box.

6. Loading and Stowage.

Crates or other approved loading gear should be used for the loading of the fruit at the ship's side.

7. Marking of Cases.

The following particulars are to appear in prominent and legible characters on the end or ends of the cases:—

(1) A true description of the fruit. The following abbreviations may be used in lieu of the name of the variety:—

Variety.	Abbreviations.
Patterson's River	Pat R.
Washington Navel	W. Navel
Thompson Navel	T. Navel
Valencia Late	Val.
Mediterranean Sweet	Med. Sweet
Parramatta	Pmta.
Seedling	Sdlg.
St. Michael	St. M.
Joppa	Jop.
Siletta	Sil.

(2) The word "Australia."

(3) The name or registered brand of the grower or the exporter.

(4) The number of oranges contained in the case.

(5) The grade of the fruit, *e.g.*, "Special," "Standard," or "Good," as the case may be.

Progress in the Tobacco Growing Industry

[By R. E. Courthope-Giles (Tobacco Instructor, Department of Agriculture).]

The Commonwealth Grant of £20,000 per annum which was made available to the Council for Scientific and Industrial Research and State Governments for a period of five years, from December, 1933, has been of inestimable value to the tobacco-growing industry. A great deal of valuable research work has been, and is still being carried out, by the various Departments concerned.

The location of suitable growing areas is one of the duties being carried out by the State Departments of Agriculture with varying degrees of success. Soil surveys, and the establishment of trial plots, are of primary importance in areas where climatological conditions are as favourable as are to be found in the different States of this vast Continent. Tobacco is being grown from Cairns in North Queensland to the Derwent Valley in Tasmania, and from our Pacific Coast to Perth in Western Australia.

The positive and negative results are of equal importance, for only the most suitable areas should be encouraged to produce flue-cured tobacco leaf, that is, if the Australian product is to compete successfully with the imported article and to satisfy the keen Australian smoker.

Flue-cured leaf is in ever-increasing demand, but a certain amount of fire-cured and air-cured leaf will always be required for blending purposes, and their production should not be entirely overlooked by the State experimentalist if the hopes of the tobacco growers of producing the whole of the country's requirements are ever to be realised.

The light soils which are producing palatable tobaccos, with pleasant aroma and good burning qualities, are becoming firmly established as suitable for the production of flue-cured leaf. The law of supply and demand must apply. The verdict of the consumers will eventually decide the fate of the producing areas.

It is highly probable that some areas which are producing flue-cured leaf to-day may revert to their original practice of air or fire-curing on a limited scale in the course of time, while other areas may also find that their soils are more suited to the production of other commodities. Inferior leaf is a drug upon the market, and its production should not be persisted with, for the soils producing this leaf are extremely fertile as a general rule and will give adequate returns with other commodities entailing less labour and less capital outlay. The uncertainty of rainfall even in the most suitable areas of Australia has been amply demonstrated during the past few years. To overcome this difficulty, wherever possible, growers are installing the necessary plant for irrigation—generally a sprinkler system of some sort—as being most suited to light sandy soils, more beneficial to tobacco than flooding, and the only method by which water can be distributed with uniformity and perfect control. Any check to the normal life cycle of tobacco plants, whether it is due to drought or any other cause, has a deleterious effect upon the cured leaf with consequent reduction in cash value. Growers should install the necessary irrigation plants as an insurance against drought and raise their standard of quality generally.

The discovery of the benzol method of fumigating seedlings, by officers of the Council for Scientific and Industrial Research, has to a great extent overcome the Downey Mildew or Blue Mould disease. If properly applied, this treatment can be absolutely guaranteed to prevent any outbreak of this trouble while plants are still in the seed beds, thus ensuring an ample supply of seedlings to growers. It is still possible for Blue Mould to attack plants at a later stage after transplanting has occurred, but it is hoped that this will eventually be overcome by the breeding of disease-resistant varieties. In this direction a good deal of progress has already been made.

During the past 18 months growers have considerably strengthened their position by the formation of a Federal Tobacco Advisory Committee, consisting of two representatives selected by the industry in each State of the Commonwealth. This body is financed by the growers by means of a levy of 10s. per ton upon all tobacco leaf sold to the manufacturers. The industry is now in a position to speak with unanimous voice upon the problems with which it is confronted. Funds would appear to be required for their propaganda work. It is quite a common occurrence, however, to find tobacco producers who smoke brands manufactured from almost 100 per cent. imported leaf when there are Australian grown and made brands available. Producers must support their own industry, and each individual should act as his own publicity agent and advocate the smoking of Australian tobacco. Money may be required for propaganda work, but the growers could do a great deal to stimulate interest in their own products at no greater cost to themselves than they are asking from the general public, that is, to smoke Australian tobacco. Production is upon the increase, but the greatest care must be taken to ensure that we are developing the industry upon the right lines. Quality must come first and foremost. Ask the public to adopt a sympathetic attitude towards a leaf, but do not expect them to accept an inferior article.

It is possible to wean the smoker from his taste for imported tobaccos by the gradual increase in the percentages of Australian leaf used in the popular blends, when the leaf substituted has good smoking qualities. This is proved by the steady increase in demand in the United Kingdom for Empire-grown tobaccos during the past 25 years. Any short cut in this direction is bound to react unfavourably upon the industry.

The smoking tests carried out during the past three years with untreated leaf have been most encouraging, as each season has shown a marked improvement in the general smoking qualities of samples received.

While the appearance of leaf may be most attractive from the colour standpoint, and upon handling indicate the qualities of texture and elasticity required by the manufacturer, it is still possible for leaf to have poor smoking qualities, and in extreme cases to be positively offensive. A blend of tobaccos can be ruined by the inclusion of leaf of this nature. It is impossible under existing conditions for Government officials to prevent the production of tobacco with poor smoking qualities. Only a system of licensing would make this possible, and it would not appeal to many producers for obvious reasons. Were smoking tests conducted by a committee of growers in each State they would soon appreciate to the full the desirability of eliminating inferior leaf from the market. As buyers do not submit leaf to smoking tests before making their purchases the position can only be rectified by the producers.

It is a most difficult problem, but one that will have to be faced sooner or later for the best tobacco growing areas contain unsuitable soils, and their faults in many cases can only be detected by means of smoking tests.

The principal leaf buyers in the Commonwealth have indicated that for *the current season* they are paying an increase of 3d. per lb. upon M.1 grade leaf and 4d. per lb. for I.B.I. and B.M. grades to encourage the production of high quality tobaccos.

The important problems confronting South Australian growers at the present time are:—

1. The provision of adequate water supplies for irrigation purposes to overcome the drought bogey, to expedite growth, and improve quality generally.
2. To remove the sources of infection from Blue Mould and so prevent the field outbreaks of the disease.
3. The improvement of cultural methods; soil tillage, fallowing, and green manuring to increase the humus content of our light sandy soils. The proper application of proved balanced fertilisers, with the knowledge that the necessary plant foods can be made available under dry conditions by means of the irrigation.

These are the major difficulties. Growers are tending their growing crops with greater care, and providing the wind breaks so necessary in South Australia. At the same time far too much damage is still being done by insect pests, which is avoidable if the known methods of prevention are used.

Rough topping and picking accounts for a good deal of broken and bruised leaf, while insufficient care in the cartage of leaf to the stringing sheds and rough stacking on the benches is responsible for further damage, bruising, and discolouration due to overheating prior to the commencement of the curing process.

Growers are to be congratulated upon the improvement in their grading, and the wisdom shown in discarding low grade and inferior leaf which does not pay them to handle and is often unsaleable. The standards required are bound to rise with the increase in production, and so the elimination of the unfit becomes of increasing importance. We are developing a new but very desirable form of agriculture in Australia, which deserves encouragement, no matter what angle it may be viewed from, but we must set the right course and stick to it; success is bound to follow.

The Mules Operation on Sheep.

Question: What is the Mules operation; is it generally practised or likely to be, and what are the proven economic benefits from the operation?

This question, submitted by the Robe Branch at the recent Lower South-East Bureau Conference, was answered by Mr. W. S. Smith, B.V.Sc. (Government Veterinary Officer of the Stock and Brands Department), who said:—The Mules operation consists of removing the breech folds which run down the hind legs of some sheep from the rump to just above the hock. The operation is done with a pair of roll-cut secateurs or a pair of hollow ground shears. Although a nasty gaping wound is left it heals in a comparatively short time, and is seldom struck by flies.

Sheep may be divided into three classes, viz.:—

(1) The plain breeched type;
(2) the medium type; and
(3) the wrinkly breeched type.

It has been definitely shown that the third type, *i.e.*, the wrinkly breeched sheep, is far more prone to fly-strike than the first type, *i.e.*, the plain breeched type. The reason is that the folds of the breech become soiled with urine, a skin irritation is set up, and this becomes attractive to the blowflies.

Therefore, the removal of this fold as is done in the Mules operation prevents the accumulation of urine with its undesirable results and lessens the attractiveness of the sheep to the flies. Although the operation is practised by certain sheepowners, it is not yet widely used, but its use will, no doubt, extend considerably in the next few years.

In some experiments carried out it was shown that the operation reduced the strike incidence very considerably in the wrinkly breeched type of ewe. The main argument against its extended use is the fact that intending buyers of plain breeched ewes may find that they have bought treated sheep and that the subsequent progeny are wrinkled.

The disclaimers of the operation say that it is better to breed the plain breeched sheep. Whether it is possible to do this without loss of density is a sheepbreeder's problem.

To date, methods of preventing blowfly strike are only partially successful, *i.e.*, no method employed, whether the Mules operation, crutching or jetting, is 100 per cent. effective.

The Mules operation, by removing the breech folds, is of permanent value; whereas crutching and jetting are only temporary measures, and have to be repeated from time to time.

Whether the spread of maggot infestation in sheep will be wholly prevented by further scientific discoveries cannot be forecast, but much of the losses incurred by sheepowners through this pest may be materially reduced by—

(1) breeding plain breeched sheep; or
(2) adopting the Mules operation for wrinkly breeched sheep;
(3) crutching;
(4) jetting;
(5) reducing the fly population by means of traps.

The Management of the Farm Team

[By W. S. Smith, B.V.Sc., Veterinary Officer, Stock and Brands Department.]

Every farmer should regard his team of working horses as a power unit, and his aim should be to look after it so that it returns him the maximum of efficiency, and this can only be obtained when the team as a whole is "fit," i.e., in good working condition.

What is meant by the term "good working condition" in relation to the working horse? "Condition" can be defined as bodily fitness for the work to be done. In the case of the dairy cow we look for a lean condition; in stock for slaughter we expect to get a "high fat condition"; but in the horse we expect the body to be well covered with flesh which has been hardened on so that he is capable of doing a hard day's work without being unduly fatigued.

A horse which has been out at grass and is rolling in fat may look well, but he cannot take his place in the farm team and do his share of the day's work. Such a horse when worked hard sweats freely, tires easily, and may develop colic, founder, sore shoulders, etc.

Therefore, we must consider ways and means necessary, not only to bring a soft horse into good working condition where he can do his share of the work, but also how that "condition" can be maintained indefinitely.

First—In considering the fresh horse we must recognise that he cannot be expected to do a full day's hard work straight off the grass. He must be put to work gradually so that his shoulders harden up and his muscles toughen.

Second, and most important points, are correct watering and feeding methods. As the team must be kept in good working condition, particular attention must be paid to the method of watering and feeding. Any considerable falling off in condition impairs the efficiency of the team, and want of nourishment is one of the chief causes of this "falling off."

One of the worst and most common faults in horse management is that the team is turned out at the end of the harvest and its members left to fend for themselves. Whilst the stubbles are good they hold their condition, but, as the feed gives out they commence to fall away, and in their search for food ingest large quantities of sand which may eventually lead to colic. It also impairs their digestion, and this leads to further loss of condition. These debilitated horses cannot do a day's work and they take a considerable time to recondition.

Also, the sudden change from scarcity to plenty often leads to severe attacks of colic as the digestive organs are out of tone and are unable to deal adequately with large amounts of food. Realising, therefore, that correct feeding is an essential we will consider the main principles.

(*a*) *Water Before Feeding.*—The reason for this is that the horse drinks very rapidly, the water runs quickly through the stomach and small bowel into the water gut. Such a stream passing over an already full stomach would wash a lot of the contents through into the water gut, and if the food has only recently been eaten it will not be sufficiently mixed with the digestive juices, and so colic may result, due to indigestion.

(*b*) *Feed in Small Quantities and Often.*—Under natural conditions the horse feeds leisurely, his stomach is comparatively small and cannot hold large quantities of food at a time. The working horse, on the other hand, receives large quantities at stated intervals, and which he has to eat rapidly. Working horses should be fed four times daily, and the mid-day food should not be bulky, but small and contain more concentrates.

(*c*) *Do not Work Horses Hard Immediately After a Full Meal.*—The reason for this is that the engorged stomach presses on the lungs and heart, limiting their action and so leading to the animal tiring easily. Also, the process of digestion requires a plentiful blood supply, and if the animal is put to work the blood is diverted for muscular activity leading to a depleted supply to the digestive organs.

(*d*) *Feed and Water Regularly.*—A horse is as much a creature of habit as is his owner, and becomes used to eating and drinking at certain hours; consequently his digestive organs are ready to deal with the food at certain intervals, and a variation of this leads to less complete digestion, involving wastage and possibly colic.

(*e*) *Feed Only Best Quality Food.*—Mouldy fodder often leads to colic and forage poisoning (botulism). Dusty fodder such as clover hay leads to coughing and often to a condition known as "broken-wind."

(*f*) *Reduce the Ration when the Horse is at Rest.*—A horse should not be fed as rich a ration during a period of rest, such as the week-ends and holidays, particularly if kept in a confined space, as when working. Failure to reduce the ration often leads to lymphangitis, or, as it is sometimes known, "Monday morning disease." This disease is characterised by a swollen, hot, and painful leg.

(*g*) *Avoid sudden changes in diet,* such as from old season's to new season's hay, as this leads to colic and scouring.

Third—Watering.—The amount of water a horse will consume during the day varies of course with the temperature and work. The average amount is approximately 8 gallons, but may vary from 5 to 15 gallons a day.

The water should be fresh and pure and free from taste and smell. When working the horse should be watered four times daily, and, as previously stated, the water should be given prior to feeding and not for at least an hour after.

The bit should be removed, plenty of room allowed at the trough, and the horses should be given adequate time to drink their fill and not led away the first time they raise their heads from the trough.

Fourth—Regular Grooming.—This is an essential part of the good management of a working team. Its objects are:—

(*a*) To stimulate the skin so that it can do its various jobs efficiently.

(*b*) To remove dirt and scurf and loose hairs.

(*c*) To prevent matting of the hair in the collar region and so prevent sore shoulders.

Grooming should be done in the early morning and, if possible, after the day's work. When grooming, particular care should be paid to regions such as the shoulder and a watch should be kept for sores and galls.

Fifth—Trimming the Hooves.—The horn of the hooves continues to grow similarly to the nails, and it is important that they should be trimmed regularly to maintain an even bearing surface, and to prevent breaking away such as occurs when the hooves are long. This job is made easier if the horses are trained to have their feet trimmed when young.

Sixth—Do not overload the team; it should be able to do its work easily without having to toil.

Seventh—Watch for sick and weak horses in the team; watch out particularly for such things as sore shoulders, lameness, scouring, etc.

Eighth—Try to get the team as evenly matched as possible, both as to size and pace. A slow or lazy horse does not do his share, thus making more work for the others and so spoiling the efficiency of the team.

Ninth—Clipping.

Under natural conditions a horse's thick winter coat provides him with an extra warm covering when the weather is cold. It, also carries a big grease content. Although such a coat is ideal when he can regulate his own exercise, it has the disadvantage that when required to do hard work it causes him to sweat freely, and this leads to tiring earlier and so lowering his efficiency. Also, when the horse is worked late, as during seeding, the coat does not dry out and he remains wet all night. This is often followed by chills and colic. Again, extra grooming is required, and it renders him more susceptible to sore shoulders.

For these reasons it is advisable to clip at about the end of April and again in July or August. Farm horses should only be clipped "trace high," i.e., off the belly, and between the forelegs up to the line of the traces and below to mid forearm in front and mid gaskin behind. The shoulders are also clipped out, as this lessens grooming and helps to prevent sore shoulders.

Sick horses should not be clipped, and also do not clip in very cold or windy weather. Provide shelter for a few days after and give plenty of food.

Lastly, but not least important, pay particular attention to correct harness fitting.

(*a*) *Collar Fitting*—This is made much easier if the horse has a good collar seat. The flat shouldered horse is always liable to develop sore shoulders. In fitting the collar it must be remembered that friction is the cause of sore shoulders. Therefore, the aim should be to eliminate movement as much as possible between the collar and the shoulder. The collar should not be too narrow and so pinch the neck. It should lie easily on the shoulders from top to bottom, and there should be no see-saw motion which indicates too much stuffing in the centre.

Between the collar and the neck there should be a space which will admit no more than the flat of the fingers, and this space should be found from top to bottom.

The secret in collar fitting is to stop all lateral movement between the collar and the side of the neck but without pinching the neck.

The depth of the collar must also be considered. If not deep enough, it will cause choking; if too deep there will be too much play, leading to sore shoulders. To test the depth of a collar it should just admit the hand and wrist, but no more. Again, the collar should not rest on the neck in front of the withers. Care should be exercised with new collars until they have adjusted themselves.

(*b*) *Hames.*—These should be fitted to the collar, and the draft hook should be fairly high up, but not too high from the front of the shoulder. If the hames are too straight they will spoil the fit of the collar. They should fit snugly around the latter and be strapped tightly. A common cause of sore shoulders is to have the points of the hames hanging down 2 to 3 inches from the collar.

Wheat Varieties—South Australia

EIGHTEEN LEADING VARIETIES OF WHEAT SOWN FOR GRAIN AND HAY, SEASONS 1937-38 AND 1936-37.

[A. W. BOWDEN, Government Statist.]

Kind of Wheat.	Total Area Sown.		Percentage to Total.		Relative Position.	
	1937-38.	1936-37.	1937-38.	1936-37.	1937-38.	1936-37.
	Acres.	Acres.	%	%		
Ranee	789,058	746,442	23·49	22·57	1	1
Nabawa	429,674	514,498	12·79	15·55	2	2
Sword	341,824	390,941	10·18	11·82	3	3
Gluyas	186,874	177,711	5·56	5·37	4	5
Bencubbin	186,250	76,208	5·54	2·30	5	10
Dundee	174,849	56,485	5·21	1·71	6	13
Waratah	173,240	179,167	5·16	5·42	7	4
Ford	149,876	170,673	4·46	5·16	8	6
Ghurka	105,735	98,689	3·15	2·98	9	7
Gallipoli	88,161	98,562	2·62	2·98	10	8
Merridin	58,478	61,048	1·74	1·85	11	11
Late Gluyas	56,031	78,699	1·67	2·38	12	9
Dan	53,481	52,984	1·59	1·60	13	14
Aussie	49,125	47,030	1·46	1·42	14	15
Florence	36,008	59,810	1·07	1·81	15	12
Felix	33,355	34,154	0·99	1·03	16	17
Currawa	32,247	36,982	0·96	1·12	17	16
Sultan	31,944	33,809	0·95	1·02	18	18
Other and Unspecified	†383,215	393,797	11·41	11·91	—	—
Total State	*3,359,425	3,307,689	100·00	100·00	—	—

* Subject to slight variation.

† This may include one or two varieties which will replace the lesser ones in above list.

Analyses of Dry Pickling Compounds

When copper compounds are sold in South Australia for the dry pickling of cereals, such compounds are required to conform to certain regulations of the Pest Destroyers Act, 1919 and 1934. These requirements are:—

1. That the quantity of copper shall not be less than 50 per cent. of the whole compound. The packages must be branded to show the actual percentage of copper present.

2. That the compounds used, whether they be in the form of basic copper carbonate, basic copper sulphate, copper oxychloride, or a mixture of them, must be kept almost pure from all forms of copper which will dissolve in water. No more than ½ per cent. of any water soluble substance is to be present.

3. A fine state of subdivision is insisted upon. Thus it is that at least 97½ per cent. of the whole preparation must be fine enough to pass through a sieve having 200 meshes to the lineal inch.

The Department of Agriculture recently collected samples of twelve of the well-known brands of copper compounds and submitted them to the Department of Chemistry where they were analysed. The results of analyses are hereunder:—

Brand.	Moisture.	Total Copper.	Water Soluble Copper.	Retained on 200 I.M.M. Mash Sieve.
	%	%	%	%
Blair's Copper Carbonate	0·5	51·0	0·01	0·6
" Sporetox "	3·5	50·4	0·01	2·7
" Kilspor "	1·0	51·6	0·01	0·4
" Sickle "	1·7	52·2	trace	0·8
" Smutol Oxychloride "	1·2	52·5	trace	0·4
Dollman's Dry Pickle	1·8	52·5	trace	0·6
Faulding's Copper Carbonate	2·1	51·9	trace	0·1
" Cresco "	2·5	52·0	0·01	2·1
"Aero "	1·8	50·0	trace	1·2
" Bunticide "	2·2	50·5	trace	1·6
"Vallo " Anti-bunt	2·2	53·0	trace	0·4
" Kleen Krop "	1·9	51·2	0·01	2·2

It would appear, therefore, from reference to the above Table, that the whole of the compounds were well prepared. The copper content of every one of them was at least the 50 per cent., as required, and in no instance was there any excess of water soluble copper. The fineness of the preparations, with one exception, also met the legal requirements.

Artificial Manure Subsidy.

Under legislation passed by the Commonwealth Parliament during 1937, a subsidy at the rate of 10s. per ton, upon a maximum quantity of 20 tons used by each primary producer, is payable to primary producers who used fertiliser during the 12 months ending 30th June, 1938, in the production of primary produce other than wheat. A subsidy at the same rate and subject to similar limitation, is payable to approved organisations which supplied fertiliser without charge to primary producers, either for experimental purposes or as a measure of relief in cases of distress.

Applications for the subsidy must be lodged with the Secretary, Department of Commerce, on or before 31st January, 1939. Forms on which application should be made by primary producers are now available at post offices or may be obtained on application to the Department of Commerce, 29, North Parade, Port Adelaide.

Agricultural Shows

We have been advised by Secretaries of Agricultural Show Societies that their Shows will be held on the following dates :—

Crystal Brook	Wednesday, 31st August
Saddleworth	Saturday, 3rd September
Snowtown	Wednesday, 7th September
Adelaide Royal Show	**Saturday, 10th to 17th September**
Gawler	Thursday, 22nd September
Cowell	Saturday, 24th September
Waikerie	Saturday, 24th September
Tailem Bend	Saturday, 24th September
Eudunda	Wednesday, 28th September
Denial Bay	Friday, 30th September
Kadina	Saturday, 1st October
Kapunda	Saturday, 1st October
Naracoorte	Wednesday, 5th October
Streaky Bay	Wednesday, 5th October
Karoonda	Wednesday, 5th October
Renmark	Thursday, 6th October
Murray Bridge	Thursday, 6th October
Great Flinders (Lipson)	Saturday, 8th October
Blyth	Saturday, 8th October
Colton	Saturday 8th October
Moonta	Saturday, 8th October
Two Wells	Saturday, 8th October
Penola	Wednesday, 12th October
Loxton	Wednesday, 12th October
Strathalbyn	Wednesday, 12th October
Yallunda Flat	Wednesday, 12th October
Yorketown	Wednesday, 12th October
Jamestown	Wednesday, 12th October
Tarlee	Wednesday. 12th October
Paruna	Saturday, 15th October
Pinnaroo	Wednesday, 19th October
Maitland	Wednesday, 19th October
Mount Gambier	Wednesday and Thursday, 19th and 20th October
Willunga	Thursday, 20th October
Clare	Saturday, 22nd October
Port Elliot	Saturday, 22nd October
Bordertown (Tatiara)	Wednesday and Thursday, 26th and 27th October
Minlaton (Diamond Jubilee)	Wednesday, 26th October
Burra	Saturday, 29th October
Mount Barker	Thursday, 3rd November
Yankalilla	Saturday, 5th November
Woodside	Saturday, 12th November

The Northern Yorke Peninsula Field Trial and Show will be held on Wednesday, 24th August.

Pears and Barley.

In a recent report the Agent-General (Sir Charles McCann) made reference to matters which were of interest to growers of Pears and Barley.

Pear packers, he stated, spoilt a nice consignment of very useful fruit by still persisting in using a corrugated pad that was altogether too hard and caused top and bottom layer bruises. Forward buyers had now definitely stated that they would decline to operate in future unless packers guaranteed to use the standard Californian pads, samples of which were forwarded to South Australia after last season. This was only a very minor point to rectify now that the question of the carriage and handling of this delicate variety had apparently been carefully studied and overcome, but it was of the utmost importance that packers of Williams and all other varieties of pears adopt the same pads top and bottom that their competitors had so successfully been using for years.

In regard to barley, California was, up to date, the largest exporter of six-row barley (which in the trade was usually referred to as "Cape Barley" and included some four-row barley), and last year reaped a crop of approximately 800,000 tons, of which 180,000 tons were exported.

In brewing, two methods were used, viz., high fermentation and low fermentation, the former being used in the United Kingdom for the manufacture of ales, pale ales, etc. For this method six-row barley was required as malt because this barley had a thick skin. The layer of thick husks or barley skins, which became deposited in the bottom of the waste tin, formed a filtering mass through which the brew was strained. Although some brewers were now adopting other methods of straining, those who specialised in high fermentation still asked for six-row barley and had been showing a preference to a variety which had a thinner skin than the Mariout. There was a further objection to Mariout on account of the great loss of maltose or malt sugar when in course of manufacture.

Parafield Egg-Laying Competition, 1938-39

Review of the Competition for the Month of June, 1938

[By C. F. ANDERSON (Chief Poultry Adviser) and A. CLIFTON (Competition Attendant).]

Production.—A general rise to 50 per cent. production during the early part of June was followed by a very serious drop coinciding with two extremely cold days experienced on the 20th and 21st. This drop was probably the most drastic experience in the last few years of the competition. The cold weather was accompanied by very strong north-east winds, which blew right into the front of the pens continuously for two days, and this no doubt caused the trouble. Although several birds went into a moult following these two days, at the end of the month production again was on the increase, and for the month of June the average was 47 per cent. as compared with 47.5 per cent. for June in the previous competition.

It is also very interesting to notice that at the end of the third month of the competition the increase in food consumption was exceptional. At the end of the first week in April, that is, just after the birds had come into the competition, the amount of mash consumed in the morning was 5¼lbs. per 100 birds, consisting of equal parts of bran, pollard, and whole meal. Added to this was 1lb. meat meal, ½lb. linseed meal, and 40 per cent. green feed. (At the end of April consumption had reached what is generally recognised as the full adult ration, that is, 9lbs. of each bran, pollard, and whole meal per 100 birds. However- by the end of June consumption had increased to 13½lbs. per 100 birds, which is approximately 50 per cent. above what is considered the full adult ration, indicating the effect that the cold weather had on the appetites of the birds.

It is noticeable that during the whole period there was only a slight increase in the whole grain ration at midday and evening, and rarely does this exceed the recognised ration of wheat, namely, 12lbs. per 100 birds a day. Undoubtedly the morning mash is the main egg producer, and it is the first feed to be affected when increased production combined with cold weather is met with.

There is a number of birds not yet through the moult, and therefore not consuming a great quantity of food. It appears that the food consumption is not yet at its peak, although on taking a line through previous competitions it must be very close to it.

An exceptionally good score was the month's laying of the Black Orpington team in the Soaked Grain section, owned by Mr. J. Rawe, of Seaton Park. This team laid a total of 124 first grade eggs for the month, practically eevry egg being between 2⅛ozs. to 2¼ozs. in weight. The laying for the month of June took this team up to first place for the section.

Another good score was that of Mr. C. Bolto's trio in the Orpington section. These three birds laid 63 first grade eggs for the month and are now in second position.

One death occurred during this month, bringing the total number of deaths to two since the commencement of the competition.

Feeding Tests at Parafield Poultry Station.

A new series of feeding tests was commenced at Parafield Poultry Station on the 1st April, 1937. Five tests have been arranged each of 50 White Leghorn pullets. The principal object of these tests is to collect some accurate data concerning the results obtained from the soaked grain method of feeding in different ways, also the production of the birds under the various methods of feeding. The following is a list of the tests that have been arranged:—

A. Morning—Soaked wheat at rate of 8lbs. grain per 100 birds, meat meal ½lb. per 100 birds, greenfeed same quantity as dry grain. Afternoon—Same as morning, but meat meal ¼lb. per 100 birds.

B. Morning—Soaked wheat at rate of 8lbs. per 100 birds, ¼lb. meat meal per 100 birds, ¼lb. linseed meal per 100 birds, greenfeed same as No. 1 test. Afternoon—Same as morning, but without the ¼lb. linseed meal.

C. Morning—Soaked wheat once a day at rate of 8lbs. per 100 birds, meat meal ¾lb. per 100 birds. Afternoon—Dry wheat at rate of 1¼ozs. per bird.

D. Morning—Soaked barley twice a day at rate of 8lbs. per 100 birds, greenfeed same quantity as dry grain, meat meal ¼lb. per 100 birds. Afternoon—Greenfeed same quantity as dry grain, meat meal ¼lb. per 100 birds.

E. Morning—Soaked wheat and barley at rate of 4lbs. wheat and 4lbs. barley per 100 birds, greenfeed same bulk as dry grain, meat meal ½lb. per 100 birds, linseed meal ¼lb. per 100 birds. Afternoon—Dry grain at rate of ¾oz. wheat per bird and ¾oz. barley per bird.

The quantity of food as stated in the test will vary from time to time according to the requirements of the birds. The quantities stated in the tests are given as a basis, but are also liable to alteration according to the requirements of the stock.

Test.	No. Eggs Laid from 1st April, 1937, to 31st May, 1938.	No. Eggs Laid, June, 1938.	Total Eggs Laid from 1st April, 1937, to 30th June, 1938.
A	7,568	295	7,863
B	7,782	434	8,216
C	7,508	328	7,836
D	6,787	212	6,999
E	7,203	322	7,525

	Value of Eggs. 1st April, 1937, to 31st May, 1938.			Value of Eggs. June, 1938.			Cost of Food. 1st April, 1937, to 31st May, 1938.			Cost of Food. June, 1938.			Return Above Cost of Food, June, 1938.			Return Above Cost of Food, 1st April, 1937, to 30th June, 1938.		
	£	s.	d.	£	s.	d.	£	s.	d.	£	s.	d.	£	s.	d.	£	s.	d.
A	37	2	4	1	14	7	14	10	0	0	18	5	0	16	2	23	8	6
B	37	15	7	2	10	10	14	7	1	0	18	5	1	12	5	25	0	11
C	36	12	7	1	18	5	14	9	1	0	18	5	1	0	0	23	3	6
D	31	17	3	1	4	10	15	17	1	1	1	3	0	3	7	16	3	9
E	34	8	10	1	17	9	15	2	6	0	19	10	0	17	11	20	4	3

Production of Butter and Cheese.

The production of butter and cheese for May, 1938, was :—Butter, 1,017,969lbs. ; cheese, 903,360lbs.

Storing Superphosphate: No Detrimental Effects.

Replying to a Branch of the Agricultural Bureau who asked whether superphosphate would suffer any loss as a result of being stored from one season to the next, Mr. R. C. Scott (Chief Agricultural Adviser) states that some years ago experiments were conducted to show the effect of storage and exposure on superphosphate. The results obtained were published in the March, 1921, issue of the *Journal of Agriculture*. This work indicated that the loss of water solubility by 12 months' storage is very light, being less than 1 per cent.

Apart from a caking of the material the superphosphate does not suffer to any appreciable extent, and no practical loss occurs in storage from one season to the next.

With regard to the effect on bags, the improved manufacturing methods of the present time have practically overcome difficulty in this direction, and the bags remain quite strong despite storage over 12 months.

Agricultural Bureau of South Australia

River Murray Fruit Growers' Conference

An excellent representation of delegates from Moorook, Lone Gum and Monash, Renmark North and Chaffey, Renmark, Barmera and Waikerie attended the annual Conference of River Murray Branches of the Agricultural Bureau which was held at Berri on 16th June.

Mr. J. B. Murdoch of Waikerie (Member of the Advisory Board of Agriculture), Messrs. W. J. Spafford (Director of Agriculture), A. G. Strickland (Chief Horticulturist), M. W. Aird (Poultry Adviser), O. E. Halliday (Manager of the Berri Experimental Orchard), F. R. Arndt and C. G. Grasby (District Horticultural Advisers), H. C. Pritchard (General Secretary), and F. C. Richards Assistant Secretary of the Agricultural Bureau) were present from the Department of Agriculture.

Mr. P. Ingerson, Chairman of the Berri branch, presided—the opening address being delivered by Mr. Murdoch.

The Agenda of the Conference included questions relating to many phases of orchard and vineyard operations as well as the following papers which were productive of valuable discussions:—"Irrigation," Mr. L. W. Andrew (Waikerie); "Some aspects of Viticulture," Dr. E. Meier (Renmark); "Current Comment," Mr. R. G. Lambert (Waikerie); "Sulphur," Mr. C. W. Till (Barmera); "Nitrogen and Mould," Mr. S. E. Randell (Berri); "Fertilising of Citrus Trees," Mr. F. R. Arndt (Horticultural Adviser); "Citrus Marketing," Mr. W. N. Ellis (Berri); "Problems of a Citrus Grower," Mr. P. M. Wilksch (Berri); "The Stings of Finance," Mr. F. B. Harden (Waikerie).

Mr. M. W. Aird addressed the Conference on "Poultry Management on a Murray Irrigation Block."

Conference adopted the following resolutions:—"That the 1939 Conference be held at Barmera;" "that the Advisory Board of Agriculture be asked to approach the Department of Lands with the object of having an officer appointed in each irrigation area to police the distribution of water, particularly with regard to excess water;" "that this Conference, being strongly representative of citrus growers in the River Murray Irrigation Areas, requests the Government to appoint a Research Officer for the benefit or interests of citrus culture, and with a view to solving the many problems arising in the production of citrus along the Murray River areas and other citrus areas throughout the State;" "that the Department of Agriculture consider the advisability of appointing an Inspector of Nursery stock to ensure that trees and vines supplied to growers be true to name;" "that the Advisory Board investigate the possibility of conducting fruit growing competitions along the River Murray Fruit Growing Areas;" "that the Department of Agriculture refund to Congress delegates the equivalent of rail excursion fare from their district in cases where the railway timetable is not convenient for attendance at Congress;" "that the date for holding the River Conference be fixed earlier than at present, say, in May."

At the evening session Mr. Strickland spoke on "Vine Diseases along the River Murray Districts and their treatment, with special reference to Oidium."

Conference of Upper Eyre's Peninsula Branches

Districts on Upper Eyre's Peninsula are enjoying a particularly good season, and this was reflected in the excellent attendance at the Conference which was held at Ceduna on 29th June, under the auspices of the Laura Bay Branch. Mr. E. D. Barnett presided, and the Conference was declared open by Hon. A. L. McEwin, M.L.C. (Member of the Advisory Board of Agriculture). Messrs. W. J. Spafford (Director of Agriculture), R. C. Scott (Chief Agricultural Adviser), H. B. Barlow (Chief Dairy Instructor), A. H. Robin, B.V.Sc. (Government Veterinary Officer), C. A. Goddard (Assistant Wool Instructor, School of Mines), W. H. Brownrigg (District Agricultural Adviser), H. C. Pritchard (General Secretary), and F. C. Richards (Assistant Secretary of the Agricultural Bureau) were present from the Department of Agriculture.

The following papers were read and discussed:—"A Comparison of Farming Methods on Upper and Lower Eyre's Peninsula," Mr. W. L. Edson (Laura Bay); "The Fox Question," Mr. W. Kies (Murraminga); "Removing a Horse from an Underground Tank," Mr. C. Lowe (Laura Bay).

Mr. Robin described the Mules Operation for the prevention of blowfly strike and replied to numerous veterinary questions, and Mr. Scott spoke on the merits of the cultivator and plough for fallowing.

An interesting talk was given by Mr. J. E. Shepherd, who related some of his experiences in the Northern Territory.

The Conference adopted the following resolutions:—

"That the Government take steps to re-establish all producers on their blocks within reason, with the understanding that they receive no further assistance."

"That we ask the Government to provide the necessary facilities to test cows for tuberculosis at regular intervals."

"That the freight on fencing posts be the same as for dunnage."

"That we ask for more progressive reports on Congress resolutions and the final results, especially of resolutions referred to the Minister."

"That the 1939 Conference be held at Ceduna, arrangements to be sponsored by Smoky Bay."

"That this Branch does not approve of the present method of allocation of wheat crop subsidies and desires a method in order to give greater help to the lower yielding districts."

Prizes won in the Way District Crop Competition were presented by Hon. A. L. McEwin, M.L.C. Mr. Gaden, who with Mr. Linke won this year's Competition, said he would next year give a special prize for the Way District Competition.

At the evening session Mr. Spafford gave an illustrated lantern address, "Some Peoples of the Southern Hemisphere."

Preparing for Shearing.

[F. May (Nunjikompita).]

The sheep owner should arrange the date for shearing a couple of months before to enable the shearer to work in with other sheds. Then the shearer could let the owner know a couple of days before he is ready to start. It is no good to arrange for the shearer to come out on a certain date; he may be held up with wet weather for a week or so. If the shearer gives notice a couple of days before starting it gives the sheep owner a chance to prepare the shed and draft the sheep; that is, if ewes and wethers are to be shorn separately. See that there is a shelf on the wall for the shearer to keep his oilstone on and to sharpen the shears. Also see that the water pots are in a handy place, and it is a good idea to add a little Uzona or phenyle to the water to keep the shears clean. A pot of tar should be ready, so that a little may be dabbed on if a sheep is fly-blown or if the shearer takes off a piece of skin.

All sheds should be fitted with gratings. After the sheep have been in a pen for a time it becomes very dirty if there are no gratings. Where the shed is filled at night the weaker sheep lie down and their wool becomes fouled and unpleasant to handle. Gratings should be fitted so that they may be taken up and the yard cleaned out after shearing. The shed should have a trap-door for the shearer to let out his sheep after he has shorn them. If the shorn sheep are sent back to the same pen, the woolled sheep keep far at the back of the pen and are hard to get out; also the sheep can be kept up to the shearer better than if he has to wait until they are branded and counted and the pen refilled. The shed should be closed in to prevent draughts, and it should have a couple of skylights or a large window on the western side.

The Sheep Blowfly.

The following replies to a series of questions submitted by the Mount Pleasant Branch of the Agricultural Bureau are supplied by Mr. C. McKenna, B.V.Sc. (Government Veterinary Officer of the Stock and Brands Department):—It takes on an average seven days from the laying of the egg to the emergence of the adult fly. To this period should be added another three days required on the average for the female fly to become mature, making a total of 10 days from egg to egg. The maggot takes on an average five days before it turns to the fly.

A blowfly does not die soon after it has blown. It lives about a month and lays about 1,000 eggs.

The beetle with the large red head is the *Creophilus erythrocephalus.* It devours large numbers of blowfly maggots, and later its larvae congregate beneath the carcass and devour blowfly puparia.

CARCASS TREATMENT.

A number of different blowflies are concerned in the attack on sheep in Australia. They are divided into primary, secondary, and tertiary flies.

A primary fly is one which can of its own accord initiate an attack on a living sheep. The primary flies are:—Primary green blowfly, European green blowfly, large brown blowfly, Western Australian blowfly, lesser brown blowfly.

The primary green blowfly is responsible for most cases of primary strike in sheep. It is a medium-sized fly and is bright metallic green in colour, sometimes with a golden or bronzy sheen. The large brown blowfly is a common nuisance in houses.

The secondary fly is one which is normally unable to initiate attack on the living sheep by itself, but which follows the primary fly and takes advantage of the condition set up by their maggots. The secondary flies are:—Secondary green blowfly, small green blowfly, striped blowfly. The secondary green blowfly is often mistaken for the primary green blowfly. The former, however, is a broader and more robust fly, and its colour is a slightly darker green with a bluish tinge at the base of the abdomen, and also on the underside. The most noticeable feature by which it can be distinguished from the primary green fly is the presence of narrow dark bands crossing the abdomen at the junction of the segments.

The tertiary flies are those which are only capable of taking part in the end stages of an attack on sheep. They are of little economic importance.

There is a great deal of competition in a blown carcass between the maggots of the various species and also between maggots of the same species. In this struggle, the large hairy maggots of the secondary green blowfly overcome the maggots of the primary flies, and the result is that in the end a very small number of relatively large primary flies of a considerable number of secondary green blowflies emerge from a carcass. This fact is of importance because it shows that the secondary flies are the most important natural enemies of the primary flies.

The actual effect on the blowfly population of poisoning a carcass depends very greatly on the age of the carcass at the time it is treated. Only those carcasses should be treated by poisoning which are discovered while they are still occupied by primary flies.

After about four days' exposure in summer and about seven days in spring or autumn, the primary maggots will have left the carcass, and therefore any treatment postponed until after that time will only affect the secondary and tertiary flies. It is, therefore, necessary for effective results that the sheep owner should be familiar with the types of maggots from primary, secondary, and tertiary flies.

The full-grown maggot of the primary green blowfly is smooth and about ½in. long. It tapers very much towards the head end.

The full-grown maggot of the secondary green blowfly is "hairy," and about ⅝in. long. It is stouter than the above, and tapers more markedly towards the head.

Rainfall Table

The following figures, from data supplied by the Commonwealth Meteorological Department, show the rainfall of the subjoined stations for the month and to the end of June, 1938; also the average precipitation for June, and the average annual rainfall.

Station.	For June, 1938.	Av'ge. for June.	To end June, 1938.	Av'ge. Annual Rainfall.
FAR NORTH AND UPPER NORTH.				
Oodnadatta	0·43	0·58	3·95	4·60
Marree	0·29	0·67	3·40	5·78
Farina	0·50	0·81	3·82	6·30
Copley	0·73	1·00	3·34	7·72
Beltana	1·03	1·01	2·61	8·34
Blinman	1·00	1·52	3·66	11·64
Hookina	0·42	1·61	2·97	10·85
Hawker	0·55	1·80	3·43	12·04
Wilson	0·70	1·71	4·11	11·63
Gordon	0·88	1·37	3·92	10·25
Quorn	1·00	1·73	6·92	13·02
Port Augusta	0·93	1·13	4·37	9·38
Bruce	0·81	1·27	3·70	9·78
Hammond	0·79	1·34	3·73	11·02
Wilmington	1·06	2·36	5·64	17·17
Willowie	0·73	1·55	2·89	12·07
Melrose	1·62	3·24	8·81	22·79
Booleroo Centre	0·78	2·08	4·76	15·08
Port Germein	0·70	1·49	4·10	12·49
Wirrabara	1·32	2·63	7·51	19·13
Appila	1·13	1·74	6·90	14·55
Cradock	0·52	1·48	4·54	10·62
Carrieton	0·90	1·60	5·96	12·06
Johnburg	1·11	1·27	4·39	10·47
Eurelia	0·97	1·61	5·84	12·61
Orroroo	0·92	1·72	7·15	13·10
Naokara	0·97	1·27	3·32	11·09
Black Rock	0·63	1·52	4·33	12·24
Oodlawirra	0·70	1·23	4·42	11·37
Peterborough	0·55	1·54	4·26	13·11
Yongala	1·10	1·77	5·85	14·37
NORTH-EAST.				
Yunta	0·51	0·95	2·33	8·44
Waukaringa	0·27	0·97	2·55	7·85
Mannahill	0·27	0·88	1·55	8·06
Cockburn	0·17	0·93	1·04	7·85
Broken Hill	0·30	1·10	0·94	9·37
LOWER NORTH				
Port Pirie	1·05	1·70	5·27	13·16
Port Broughton	0·61	1·96	6·17	13·82
Bute	1·22	2·22	7·06	15·36
Laura	1·17	2·35	7·33	17·88
Caltowie	1·13	2·00	7·09	16·65
Jamestown	1·27	2·24	7·78	17·63
Gladstone	1·10	2·02	7·11	16·24
Crystal Brook	0·87	2·09	9·29	15·72
Georgetown	1·07	2·37	7·35	18·17
Narridy	0·87	2·11	6·26	15·66
Red Hill	1·29	2·33	6·92	16·54
Spalding	1·06	2·41	6·44	18·51
Gulnare	1·12	2·43	6·72	18·37
Yacka	1·30	2·08	6·32	15·34
Koolunga	1·09	2·05	5·51	15·21
Snowtown	1·32	2·18	7·01	15·67
LOWER NORTH—*continued.*				
Brinkworth	1·08	2·20	5·55	15·60
Blyth	1·35	2·18	6·76	16·68
Clare	2·36	3·32	10·42	24·42
Mintaro	2·04	3·25	11·16	23·27
Watervale	2·89	3·68	12·48	26·66
Auburn	1·79	3·09	10·41	23·89
Hoyleton	2·11	2·21	9·24	17·27
Balaklava	1·18	1·90	5·98	15·34
Port Wakefield	1·02	1·61	4·70	12·90
Terowie	0·72	1·51	5·11	13·29
Whyte-Yarcowie	0·86	1·63	4·54	13·55
Hallett	1·50	2·08	7·52	16·37
Mount Bryan	1·57	2·19	8·32	16·74
Kooringa	1·48	2·34	8·09	17·75
Farrell's Flat	1·15	2·50	8·72	18·51
WEST OF MURRAY RANGE.				
Manoora	1·41	2·42	8·39	18·87
Saddleworth	1·41	2·48	9·62	19·58
Marrabel	1·37	2·65	9·31	19·90
Riverton	1·67	2·71	9·32	20·80
Tarlee	1·27	2·29	7·81	18·06
Stockport	1·31	2·22	8·72	17·04
Hamley Bridge	0·78	2·22	6·17	16·50
Kapunda	1·07	2·44	8·40	19·71
Freeling	1·30	2·34	7·89	17·73
Greenock	1·48	2·81	10·54	21·42
Truro	1·25	2·65	7·53	19·72
Stockwell	1·36	2·71	8·12	19·98
Nuriootpa	1·90	2·88	11·55	20·77
Angaston	1·44	3·10	10·69	22·29
Tanunda	1·36	3·13	8·89	21·94
Lyndoch	1·31	3·44	10·41	23·17
Williamstown	2·00	4·51	13·90	27·41
ADELAIDE PLAINS				
Owen	1·29	1·70	7·70	14·83
Mallala	1·01	2·25	6·75	16·39
Roseworthy	0·94	2·39	7·94	17·37
Gawler	1·24	2·55	9·28	18·81
Two Wells	1·28	2·28	6·32	15·75
Virginia	1·33	2·46	7·43	17·17
Smithfield	1·77	2·49	9·03	17·62
Salisbury	1·77	2·70	9·73	18·49
Adelaide	2·37	3·07	12·35	21·17
Glen Osmond	2·93	4·10	13·42	25·84
Magill	2·61	3·89	13·24	25·24
MOUNT LOFTY RANGES.				
Teatree Gully	2·46	4·23	14·12	26·83
Stirling West	5·80	7·79	25·87	46·86
Uraidla	4·89	7·23	22·46	43·64
Clarendon	3·72	5·11	16·43	32·74
Happy Valley Res.	2·46	3·56	12·99	—
Morphett Vale	2·61	3·37	12·20	22·56
Noarlunga	3·70	3·11	15·46	20·35
Willunga	3·22	3·91	12·49	25·91
Aldinga	2·24	3·17	8·78	20·11

RAINFALL—*continued.*

Station.	For June, 1938.	Av'ge. for June.	To end June, 1938.	Av'ge. Annual Rainfall.
MOUNT LOFTY RANGES—*continued.*				
Myponga	3·19	4·64	13·01	29·45
Inman Valley	3·79	—	11·34	—
Yankalilla	2·25	3·72	8·48	22·70
Mount Compass	3·91	5·59	14·06	36·32
Mount Pleasant	1·95	4·13	11·41	27·02
Birdwood	2·61	4·53	14·41	28·86
Gumeracha	3·58	5·21	17·01	33·12
Millbrook Reservoir	3·82	4·97	20·91	34·00
Lobethal	3·62	5·93	18·00	35·79
Woodside	3·15	5·09	14·50	32·01
Hahndorf	3·96	5·44	16·83	34·65
Nairne	2·81	4·08	11·05	28·04
Mount Barker	2·71	4·44	13·36	31·17
Echunga	3·74	5·12	16·47	33·25
Macclesfield	3·22	4·33	12·28	30·29
Meadows	4·28	5·36	17·28	35·93
Strathalbyn	1·80	2·49	7·49	19·35
MURRAY FLATS AND VALLEY.				
Meningie	1·78	2·62	9·00	18·28
Milang	1·17	2·08	6·44	14·85
Langhorne's Creek	1·46	1·90	5·91	14·99
Wellington	1·23	1·88	6·52	14·68
Tailem Bend	1·17	1·77	7·43	15·19
Murray Bridge	1·27	1·62	4·85	13·51
Callington	0·93	1·92	3·96	15·14
Mannum	0·89	1·35	4·29	11·51
Palmer	0·86	1·90	6·16	15·70
Sedan	0·48	1·53	3·94	11·99
Swan Reach	0·44	1·20	3·76	10·60
Blanchetown	0·40	1·16	3·09	10·97
Eudunda	0·83	2·24	7·38	17·16
Point Pass	1·27	1·84	7·04	16·93
Sutherlands	0·23	1·33	2·65	10·73
Morgan	0·45	0·99	2·38	9·12
Waikerie	0·47	1·16	2·23	9·71
Overland Corner	0·58	1·12	2·66	10·21
Loxton	0·73	1·18	3·34	11·34
Berri	0·82	1·06	3·70	10·11
Renmark	0·44	1·11	2·71	10·37
WEST OF SPENCER'S GULF.				
Eucla	0·96	1·13	4·86	10·06
Nullarbor	1·40	1·33	5·38	8·79
Fowler's Bay	3·71	2·16	7·82	11·89
Penong	2·74	1·89	8·69	12·22
Koonibba	2·14	1·73	10·67	12·16
Denial Bay	3·03	1·71	10·52	11·31
Ceduna	2·17	1·53	9·55	10·30
Smoky Bay	2·98	1·75	10·12	10·42
Wirrulla	2·25	1·64	12·61	10·71
Streaky Bay	5·54	2·78	13·59	14·85
Chandada	3·13	1·70	11·84	12·31
Minnipa	2·82	2·11	12·05	13·83
Kyancutta	2·98	1·64	9·75	13·16
Talia	3·00	2·59	11·15	14·50
Port Elliston	2·86	3·18	11·67	16·44
Lock	2·86	2·37	11·03	16·23
Mount Hope	3·91	2·21	12·86	—
Yeelanna	2·50	2·44	10·04	15·92
Cummins	3·60	2·90	11·98	17·47
Port Lincoln	2·35	3·12	10·09	19·27
Tumby	2·17	1·86	8·36	14·16
Ungarra	2·38	2·32	8·32	16·81
Port Neill	1·81	1·72	7·68	13·06
WEST OF SPENCER'S GULF—*continued.*				
Arno Bay	1·07	1·57	5·74	12·72
Rudall	1·60	1·52	7·57	12·94
Cleve	2·00	1·93	8·55	14·90
Cowell	0·57	1·27	3·61	11·06
Miltalie	1·61	1·68	6·83	13·72
Mangalo	1·57	1·77	6·10	13·80
Darke's Peak	2·49	2·15	8·11	15·08
Kimba	1·57	1·43	6·17	11·64
YORKE PENINSULA.				
Wallaroo	1·39	2·04	7·40	13·93
Kadina	1·39	2·23	8·40	15·53
Moonta	1·10	2·15	7·53	14·98
Paskeville	1·40	2·28	7·23	15·47
Maitland	1·40	2·98	11·00	19·76
Ardrossan	0·66	2·01	6·08	13·91
Port Victoria	1·18	2·26	7·92	15·33
Curramulka	0·98	2·71	6·30	17·72
Minlaton	1·46	2·75	8·71	17·65
Port Vincent	0·66	2·24	4·66	14·26
Brentwood	2·19	2·31	8·65	15·52
Stansbury	1·41	2·46	6·65	16·75
Warooka	2·22	2·66	8·69	17·38
Yorketown	1·85	2·58	7·96	16·81
Edithburgh	2·22	2·35	9·19	16·31
SOUTH AND SOUTH-EAST.				
Cape Borda	4·45	4·56	14·12	24·83
Kingscote	3·05	2·99	10·22	19·20
Penneshaw	2·37	2·78	8·89	19·09
Victor Harbour	1·78	3·18	8·94	21·37
Port Elliot	1·83	2·81	8·91	19·93
Goolwa	2·13	2·43	10·16	17·85
Maggea	0·80	1·15	3·71	10·32
Copeville	0·54	1·39	5·35	11·64
Claypans	0·43	1·18	4·01	10·77
Meribah	0·45	1·12	3·61	11·26
Alawoona	0·94	1·17	3·77	10·43
Caliph	0·71	1·09	4·24	10·60
Mindarie	0·81	1·43	4·52	12·16
Sandalwood	0·85	1·68	4·96	13·67
Karoonda	0·72	1·67	4·97	14·33
Pinnaroo	1·05	1·59	5·08	14·14
Parilla	1·13	1·65	6·79	13·67
Lameroo	1·11	1·88	6·87	15·79
Parrakie	1·32	1·69	6·00	14·58
Geranium	1·12	1·90	6·93	16·36
Peake	1·22	1·86	7·00	15·87
Cooke's Plains	1·17	2·00	8·15	15·33
Coomandook	1·41	2·22	8·10	17·01
Coonalpyn	1·96	2·31	8·80	17·65
Tintinara	1·72	2·43	8·88	18·68
Keith	2·15	2·18	9·07	17·95
Bordertown	2·58	2·49	8·79	19·16
Wolseley	2·31	2·34	7·51	18·50
Frances	2·80	2·49	10·21	20·18
Naracoorte	3·42	3·17	11·30	22·64
Penola	3·59	3·47	11·27	25·89
Lucindale	4·23	3·43	13·32	23·48
Kingston	4·36	3·83	11·09	24·24
Robe	5·14	3·98	11·43	24·63
Beachport	4·89	4·56	14·25	27·06
Millicent	5·22	4·56	18·10	29·98
Kalangadoo	4·26	3·95	16·37	32·00
Mount Gambier	5·50	3·92	15·70	30·29

Agricultural Bureau of South Australia

Papers Read at Conferences

The Marketing of Citrus Fruit

[N. W. Ellis, Berri (River Murray Fruitgrowers' Conference).]

The Export Trade.

It is essential that the export trade in citrus should be built up on sound lines and that there should be co-ordination in the growing, harvesting, packing, and selling of the fruit. There must not be one weak link in the chain to ensure success, and having reached a satisfactory standard of efficiency, it must be maintained.

Harvesting.

In harvesting for export, gloves must be worn and the fruit snipped from the tree. In snipping the fruit, care must be taken and only blunt-nosed snips used so that the top of the orange is not scratched and the stem of the orange is cut flush with the top and sharp-angled cuts of the stem avoided; otherwise the sharp stem will puncture the next orange with which it comes in contact, and materially shorten the life of that orange.

Picking Bags.

When using picking bags that are filled from the side, care must be taken to frequently shake out all dust, small twigs, etc., which get into the bags as the fruit is being picked. The picking bags that let the fruit out of the bottom have an advantage in this respect. When using the latter type, lower the fruit carefully into the picking boxes, and if sweats are being used, the centre cleat must be covered with a piece of hessian to protect the orange, lemon, or mandarin from its sharp edges. The fruit should then have a smooth journey to the packing shed, so that it is not bruised in transit.

Sweating.

Oranges and lemons that are being shipped from the end of May until the end of June should not be sweated more than a week prior to packing, and mandarins about three days. In July, lemons being shipped require about a week, but oranges should only have three days' sweating and mandarins one day. After July these three varieties should not be sweated, but picked one day and packed the next, so that the fruit can be sold in the best possible condition.

Packing.

The present export standard of the quality of fruit required is about right, but in many instances the fruit is packed too high in the case and too much work is left for the lidding press, with consequent damage to the top layers of fruit. The pack should be snug and tight for lemons and oranges, and a little less so for mandarins. The packer should apply firm pressure with the hands when the box is one-third full, and again when two-thirds full, and leave less to the lidding press. Oranges are pushed out of shape by being packed too tightly. The buyer expects an orange of normal shape, not one square or oblong. In wrapping, any surplus paper should be placed in the spaces of the immediate lower layer of fruit and not tucked to one side so that some of the fruit is resting on too much paper which helps to create a false impression of the pack, and eventually have a detrimental reaction on sales. The labels should be neat and distinctive, without being gaudy, and the stencilling neat, bold, and easy to distinguish. The strapping or wiring needs to be done well and tightly enough to prevent slackness when the fruit arrives. The whole "get-up" of the pack should create a good impression, showing good taste and workmanship by the packer; otherwise the fruit will not fetch its true value. As the cases are finished off, they should be stacked on their sides and not on the bulge.

Pre-Cooling.

Fruit which is shipped during June and July should not be pre-cooled, and much harm has been done in the past by the delay and extra handling which has taken place when the fruit has been pre-cooled.

To obtain a grip upon the United Kingdom market, and hold it, growers must send an orange that has a reasonable life after reaching its destination. Last year a good deal of the fruit was 3 and 4 weeks old before it was placed on the boat to leave South Australia. This period was made up as follows:—7-10 days allowed for sweating; 7 days allowed for packing; 7 days allowed for railing and pre-cooling. In one case the boat was a week late in sailing, making the fruit 8-9 weeks old before being offered for sale. Growers should aim at regulating the deliveries to packing sheds so that there should be no delay between packing and shipping the fruit. The central packers can place the fruit in the truck at the shed and rail it to the ship's side.

Cut out all unnecessary handling of fruit for export and place it on the market as quickly and as fresh as possible. If pre-cooling is necessary for later shipments, why could it not be done on board ship by making arrangements with the ship's engineer to have the temperature gradually brought down to the temperature required over a period of 4 to 5 days. The fruit would then be well on its way instead of being in a cool store on land, creating an unnecessary storing and handling charge to be borne by growers.

Marketing.

Whilst the export to New Zealand has been satisfactory in the past, the sending of citrus to the United Kingdom market has been a distinct hazard; and the action of a number of far-sighted growers is commendable, insomuch as they have refused a local remunerative price in order to develop the United Kingdom market with its attendant risk. Competent judges declare that growers along the River Murray produce an orange that is unsurpassed in the world for appearance and flavour. The blocker is not faced with the necessity for "dolling-up" an inferior article for selling, because of the advantage of having a superior article for sale; therefore the marketing plans should be in keeping with the quality of the fruit produced.

In the United Kingdom, Australia has to compete with countries closer to the market, and with lower production costs, and although our fruit is more than holding its own competitively, yet the nett returns are disappointing. After having assured ourselves that we are obtaining the best market price possible by employing a man or agents with undoubted sales ability and a knowledge of the United Kingdom trade, we have then done all that we can at the selling end. We then have to examine costs of production to see if we can increase the margin of profit.

We cannot cut down our labour cost, as that is increasing, if anything; but if we could buy boxes cheaper and also all incidental packing requirements, a considerable saving would be made.

If by cutting out pre-cooling we save 6d. per case and can save another few pence by buying cases and packing to better advantage, and look for a cut in freights and selling costs, we might possibly lower costs of production and make the United Kingdom export more profitable.

Australian Markets.

The growers of citrus and the purchasing public would be better off if all citrus growers were loyal members of an association that made all their selling arrangements for them. Each citrus district along the Murray could have its own sales officer who could instruct growers when and where to send their fruit. The proceeds of all fruit could be pooled and the grower paid through his own association for the quality and variety of fruit grown.

The fairly extensive planting of the "Improved Late Valencia" sometimes called the "Berri Valencia" and "Lord Howe" will do away to a large extent with early and late markets, and that oranges will be on the market all the year. This being so, orderly marketing is essential in order to prevent a frequent "glut" of oranges on the market. The supplies could be regulated according to the requirements of the markets being supplied. Artificial colouring of fruit could then be largely dispensed with. It would be better to receive a payable price for all fruit rather than nett 6s. a case when the market is bare and 2s. when the market is oversupplied.

Picking and Packing.

Reasonable care must be taken in harvesting fruit for the home market. I prefer it nipped rather than pulled.

We should pack three grades of Washington oranges; — Special — Standard — and Plain. The "Special" pack would be equal to export standard. The "Standard" could incorporate some of the fruit now sold in the "plain" pack. The "Plain" pack could include some of the sound, skin blemished fruit that is wasted or sold as "Culls."

The keeping and eating qualities of a skin blemished orange are often superior to one that is without blemish, and the buying public should not be trained to buy through the "eye" alone. There appears to be a ridiculous rivalry between some of the sheds as to who can force into a case the most oranges, when all that is required is to pack tightly enough for the case to be full when opened in the market. River oranges for the Adelaide market are sometimes packed so tightly that they have been pushed out of shape, and this over-tight pack has been condemned by merchant and buyer alike. Whilst machine lidding is essential, the machine should not be required to exert any more pressure than if nailed down by hand.

General.

I do not favour the general practice of having 3 grades for mandarins and lemons, but believe that an extra good pack of either variety could be branded "Special" with advantage. It is profitable to pick the larger mandarins as soon as possible, to relieve the tree, which then has more energy to bestow on the remaining fruit. The lemon should be treated similarly, but commencing about the middle of May when only fruit about 180 to the case should be picked. If the trees are gone over 3 weeks later, another batch of 180's will be ready, and so on until July, after which date the lemons could be left to grow in size and be sold for peel near the end of the year. I would emphasise the need of all citrus growers being loyal to each other and themselves by organising for better results.

Current Comment

[R. G. Lambert, Waikerie (River Murray Fruitgrowers' Conference).]

In this paper it is proposed to confine my comments to some aspects of the industry which, though not intimately related to the individual grower, are nevertheless matters of importance to the future welfare of the industry as a whole.

During recent months, I have been forced to the conclusion that though we have developed the most highly organised form of co-operation that has ever been devised for a primary industry in any part of the world, we are, as a whole, largely individualistic and self-centred. We are almost solely concerned with our immediate problems and district; we have for instance, little interest or knowledge of how other parts of the State or Commonwealth are faring, and *vice versa.* The result has been a complete lack of sympathy and understanding between ourselves and other sections of the community.

This is a regrettable circumstance, for it must be remembered that we are producing an article which on leaving the packing-houses is ready for entry to every home in the Commonwealth. Unlike wheat or wool, it is a manufactured article ready for consumption. To sell to best advantage, therefore, it is essential to hold the goodwill and esteem of every housewife and householder in the Commonwealth. It is with those thoughts uppermost in mind that the following comments are offered.

Experimental Work.

In the production of dried fruit we are largely influenced by scientific investigation; which in the past has been almost solely confined to Government Experimental Orchards, aided in recent years by the Commonwealth Council for Scientific and Industrial Research. Much as we value and appreciate the fine work that is being carried out at the Berri Government Orchard, most growers realise and agree that the experiments deing conducted there are by no means complete; they are chiefly designed with the object of finding an ultimate result to a given procedure, and few if any are designed to give maximum result to minimum of effort. Whilst a portion of the property might well be devoted to experiments in reclamation, the portion now being used for manurial experiments on vines, *i.e.*, "The Farm," is by no means a typical soil type of the fruitgrowing areas. Indeed, it would be difficult to confine such experiments to any given locality, so wide are the soil variations. For some years I have been greatly impressed by the beneficial results accruing from the Crop Competitions conducted by cereal growers. These Competitions have been of inestimable value in proving the varieties of wheat, &c., best suited to a given locality and the cultivation necessary to obtain best results. Would not a somewhat similar Crop Competition be practicable for fruitgrowers?

It should be noted that both the C.S. and I.R. and District Instructors in recent years, have adopted the practice of conducting experiments on private enterprise, with excellent results, and it is certain that a sufficient number of earnest growers would come forward to ensure the success of such a scheme. There are many growers with individual ideas of production which it is not possible to test on a Government orchard. Such a scheme would considerably augment existing Government investigation without further Government expenditure, and would be an effort to help ourselves. We have repeatedly received adverse criticism for frequent appeals for Government aid to our industry.

Growers' Organizations.

Most growers are aware that some anomalies exist in our association with the packing houses, such as commodity prices and interest on accounts. It is unjust that a small grower who pools his fruit in order to maintain prices for all should be charged interest when he might, by selling for cash, be in a position to pay cash for his requirements. Some concession should be made by the large shareholder, even if it means a cut in dividends. If we are to claim the confidence and respect of the whole community it is essential that we have complete confidence and respect within our own ranks from our leaders to our smallest grower.

Restriction on Plantings.

This is another subject upon which further light could be shed in outside circles. To those within the industry who have a full knowledge of the saturation reached in overseas markets, particularly Canada and New Zealand, the wisdom of such policy is undoubted, but to the rest of the community such policy has every appearance of a dog-in-the-manger attitude. Whilst we proclaim the River Districts as the best business centres in the State, we prohibit others from participating.

Generally speaking, population is largely governed by economic circumstances, and it is problematical as to whether our family life has not been influenced by the lack of scope and opportunity for further expansion. Certain it is that at the present time many settlers, including some ex-soldiers, have sons who know no other calling and who are seeking opportunity to establish themselves in homes. Viewed from within or without our industry the position is one which cannot remain tenable indefinitely; it presents a state of stagnation. The fruitgrowing areas are but a fraction of the fertility of the Murray Valley, and with this in view the industry should be foremost in propounding schemes for further development of the River areas. As the site for the Whyalla Water Scheme is now being given consideration, representation should be made to have this supply traverse the North Murray lands. This area, although of considerable pastoral value, is hampered by lack of rainfall and inability to tap artesian supplies of water. The provision of water for stock purposes would considerably increase its carrying capacity. Lock 6 suggests itself as a suitable site, as any site below Morgan would result in a considerable area of adequate rainfall country being traversed, with suitable sites for catchments. In addition, a cursory survey leads one to believe that the engineering difficulties of the project would be minimised, as the major portion of the route from Lock 6 to Port Pirie would be below the 1,000ft. level.

Nitrogen and Mould

[S. E. Randell, Berri (River Murray Fruitgrowers' Conference).]

The heavy losses sustained during the past 4 or 5 seasons through the development of mould in the vine fruit along the Murray, more especially the currant, and the fact that these "mouldy" years have coincided with a more liberal dressing of nitrogen to soils applied directly as fertilizer and also in the form of cover crops, has caused much speculation as to whether the two things are not closely connected. This suspicion, which, if it is an exaggeration to say is widespread, is certainly held by not a few, seems at first sight to have much to support it.

The theory appears to be that the tonic effect of abundance of nitrogen in the soil encourages rank growth and doubtless also greatly increases the crop, but that the fruit itself, owing to this forcing process, lacks "body" and is easily broken down. As the berry enlarges the skin becomes thinner (like an expanding soap bubble), the result being that when subjected to unseasonable rain during ripening, it splits and ferments far more readily than is the case when the vines are fertilized with non-nitrogenous manures, or with nitrogen only sparingly applied. Moreover, some contend that the form in which the nitrogen is applied is of consequence. The inorganic forms, sulphate of ammonia or nitrate of soda, for instance, being more detrimental than the slower-acting manures.

This is substantially the idea of those who support the "nitrogen-mould" theory. From my observations and experiences I have arrived at different conclusions. Nitrogen is the most costly fertilizer, and if we could be convinced that its use could be largely dispensed with, without detriment either to quality or quantity of the crops, no doubt it would cause much gratification.

The Currant Vine.

This crop seems to have been the greatest sufferer in recent years. On my holding I have 2 plantings of currants, viz. about 1 acre with rows running approximately south-east and north-west; Plot A; and the other (about 3 acres) with rows running at right angles to the first mentioned patch; Plot B. From their respective situations, a west or south wind hits the side of Plot A, but in the case of Plot B with the wind in the west it strikes the rows at an angle, and thus can penetrate to a certain extent. As the wind veers from west to south, it blows freely and uninterruptedly down the rows until the breeze is due south, when it again strikes the rows at an angle. Thus this patch, with the wind in the usual quarter following rain, has for a considerable time the benefit of a breeze most favourable for drying the fruit, and also to a considerable extent when the wind is due west or south; whereas only the outside row of vines in Plot A receives the advantage of the wind. and even then on the windward side only. the other rows merely obtaining what airs the dense foliage will permit of passing through.

In the 1937 season, which was so disastrous to the currant crop owing to unseasonable rain, the damage to Plot A was considerable, but not uniformly distributed through the patch. The outside row, which received the full force of the south or west wind, showed only slight damage from mould; the next row revealed more extensive damage, and so on, each succeeding row showing increasing quantities of mould, until the last rows sustained a loss of over 80 per cent. Moreover, in every row the damage was greatest in the centre, and least at the ends where the vines received the advantage of the wind blowing along the headlands. With the outer patch of vines separated only by a 20ft. headland, but with the rows running at right angles to it, the loss was absolutely nil. This year I had the same experience in a modified form, *i.e.* a certain amount of damage to Plot A, while the loss in Plot B was negligible.

Both of these plots are on similar soil and had received the same quantity of fertiliser, viz., 2cwts. each of sulphate of ammonia and superphosphate per acre, plus a well-grown cover crop of Tick Beans. The foliage in the undamaged acreage was quite as dense as in the badly damaged plot, but the vines are trellised at a greater height. It may be contended that too much importance cannot be attached to one single experience, but does it not seem reasonable to assume that in this instance, at least, the free access of wind was the predominant factor in minimising the mould damage to the rain-cracked fruit?

The Smyrna Fig.

All fig growers know to their cost what damage can be done in an unfavourable year, such as 1937. Rain undoubtedly causes the most havoc, but the figs split through agencies other than rain. One of the reasons confidently advanced is the too liberal application of irrigation water, and it sounds plausible. Acting on this surmise, this year I withheld water from the fig trees during the ripening period until most of them showed signs of distress, some trees losing nearly the whole of their leaves before I could relieve them, but still the fruit continued to split. I consequently scrapped the water theory, as applied to fig trees. I had treated them somewhat heavily with sulphate of ammonia, and here, I thought, was a fairly clear case of fermentation due to an over-plus of nitrogen. However, further enquiries disclosed the fact that some growers were experiencing the trouble of split figs while giving their trees no fertiliser whatever, the reason advanced by these growers being that the trouble was due to over-caprification by the Blastophaga Wasp. This was the explanation given by Mr. C. G. Savage some years ago, and assuming that it is correct, it would appear that an abundance of nitrogen would be of assistance rather than otherwise, inasmuch as it would encourage vigorous growth of the tree and a more plentiful crop. This in turn would provide a greater number of figs for the wasps to enter, with the result, probably, of a smaller proportion being over-fertilised.

Harking back to the vine, it will be evident that I do not attach much—if any—importance to the belief that manurial practices tend to increase mould. The fact that we can expect serious trouble if a cool, drying wind does not quickly follow the rain is common knowledge to all, but the theory that liberal applications of nitrogenous fertilisers and the now fairly general practice of growing cover crops contributes to mould damage is quite erroneous. It is hardly possible under our conditions to overdo the growing of cover crops, especially when they are grown only in alternate rows; neither do I think that the form in which the nitrogen is applied as a fertiliser has any bearing on the question of mould. Whether given in the inorganic form, such as sulphate of ammonia, or the organic, as blood manure for instance, both have to be converted to the nitrate before they become available to the plant, and the ultimate result as regards benefit to the plant is identical.

A close compact bunch of fruit is more liable to ferment than is a sparse, open one, and in this respect soil rich in nitrogen no doubt affects the issue, as a heavy crop of large berries will suffer proportionately in a rainy season more than a small crop of inferior fruit. Carrying this line of reasoning to its logical conclusion, we may say that the poorer the crop and the smaller the berry, the smaller the loss, and it is only when the crop has reached the vanishing point that the risk of mould disappears. Clearly, salvation is not to be sought along those lines. Referring for a moment to the matter of tight, compact bunches of fruit, we have on previous occasions had an explanation of the methods practised by some growers, by means of which they obtain a loose, open bunch without in any way diminishing the weight of the crop.

The manurial tests at the Berri Experimental Orchard have proved beyond doubt that for the production of heavy crops of quality fruit, nitrogen is the dominant factor, and to omit or reduce this most valuable fertilising agent, or slacken up in the growing of cover crops in a vain endeavour thereby to combat mould, would be a decidedly retrograde step. In view of the fierce competition in the overseas markets from growers with a lower standard of living than our own, it would be an experiment that would prove very costly indeed.

Freedom from mould is entirely a matter of weather, and the trellises being in such a direction as to permit of a free passage of the air when the wind does arrive at the opportune time. The seasons are beyond our control, nor is it possible—at the present development of meteorological knowledge—to forecast months ahead what the coming season has in store for us. A survey of the records will soon convince us that since irrigation was first introduced in the Murray Valley the "good" years far out number the "bad" ones; "bad" from our point of view. A rain that is hailed with delight in the pastoral areas often causes consternation for us. As regards the currant vine in particular, the unfavourable seasons have been all too evident of late, but good seasons will surely return. The wise course would seem to be to take the optimistic viewpoint and go ahead with full and complete cultural operations expecting and hoping that every season will prove a "good" year. The final result is, of course, "in the lap of the Gods," but this policy, diligently and persistently adhered to, will, in the long run spell success.

Sulphur

[C. W. Till, Barmera (River Murray Fruitgrowers' Conference).]

Sulphur is an elementary non-metallic substance of a greenish-yellow colour occurring abundantly in mineral, sparingly in the animal and vegetable kingdoms. It has been known to exist since the remote ages, the Romans and Greeks both knowing its uses and applications.

Its wide prevalence, colour, and combustibility attracted early attention. Linen was bleached with it as early as 2000 B.C., and certain Egyptian paintings of about 1600 B.C. contained colours requiring sulphur compounds. It is mentioned in the Bible. Homer referred to its disinfectant properties. The Caesars used it for incendiary weapons of war, and the Romans also used it for obtaining the desired finish when casting statues of bronze.

Sulphur was regarded by the early alchemists as a peculiar kind of earth, a fat mineral substance that could be melted and its oil burned. For a long time sulphur was not regarded as an element, but Davy in 1808 believed that sulphur as such contained some combined oxygen.

Occurrence.

There are in general three kinds or types of deposits in which free or natural sulphur is found:—

1. *Solfataras or Volcanic Vents.*—Sulphur deposits are produced by the oxidation of hydrogen sulphide, a gas that is the common emanation of volcanoes. A number of active volcanoes in Japan yield a small quantity of sulphur, and this is

recovered by passing the escaping gases through condensers. In the ordinary process sulphur ore is charged into retorts which are then sealed and the sulphur is distilled over with heat produced from coal —the molten sulphur recovered in the condenser is cast into convenient sizes.

In Chile only a small portion of the sulphur deposits are worked, as their location is on the high volcanic peaks of the Andes, 13,000ft. to 20,000ft. above sea level. The refining process is similar to Japan.

2. *Mineral Springs.*—Deposits on a small scale may be seen incrusting hot springs in the Yellowstone Park, California.

3. *The Natural or Elemental Sulphur of the Gypsum Type.*—This is the most important group producing 95 per cent. of the world's supplies and such deposits have been formed by the reduction of sulphates or by thermal volcanic activity.

In U.S.A. both types are found, the producing centres being chiefly Texas, Louisiana, California, Nevada, Utah, Oregon, Colorada, and New Mexico. These deposits form a part of the "ring of fire" which girdles the Pacific Ocean, and account for sulphur deposits in New Zealand, Java, Japan, Aleutian Islands, Alaska, mountains of Mexico, and the entire length of the Andes.

The oldest commercial deposits exist in Sicily and have been worked since the Twelfth Century; other deposits exist in Italy, Spain, Russia, Greece, and Turkey. American sulphur imported into Australia is said to be 99.7 per cent. pure.

Annual Production, 1930.

U.S.A.	2,500,000 tons
Sicily and Italy	343,000 tons
Japan	61,000 tons
Chile	18,000 tons

The method of raising sulphur to the surface in U.S.A. makes an interesting study. The deposits are of the gypsum or natural type, and occur in cap rock overlying salt domes from 500ft. to 1,500ft. below surface.

In mining, wells are drilled into the sulphur formation. A 6in. pipe extends through the sulphur-bearing stratum and rests in the upper portion. A 3in. pipe is placed inside the 6in. reaching nearly to the bottom of the larger pipe but resting on a collar and sealing the space between the two. Finally a 1in. air pipe inside the 3in. pipe extends to a depth slightly above the collar just mentioned. The 6in. pipe is perforated above and below the collar —the upper set of holes permitting the escape of hot water and the lower set the entrance of molten sulphur.

Sulphur has a fairly definite melting point at 240° F., and hot water is pumped down the spaces between the 6in. and 3in. pipes whilst compressed air released at the bottom of the 1in. pipe raises liquid sulphur to the surface of the ground.

Sulphur as a Chemical Food or Tonic.—Elemental Sulphur, as Flowers of Sulphur. Crushed Sulphur, both pure and conditioned with Kaolin, and Colloidal Sulphur, is used to control fungus growth in vines and fruit trees. It is also used in chemical combination as Lime Sulphur solution. Diluted sulphuric acid and copper sulphate are also used for similar purposes.

Since sulphur is one of the main constituents of wool, hair, and horn, it is necessary that it be present in pastures. Most crops remove more sulphur than phosphates from the soil, and in fact sulphur and phosphate deficiency are closely allied. It is estimated that under normal conditions wheat removes 12lbs. of sulphur to 9lbs. phosphorus, lucerne 50lbs. of sulphur to 18lbs. phosphorus per acre. Plants removing a quantity of sulphur from soil, such as the mustard plant and cabbage, respond well to sulphur in soil where deficient, *i.e.*, less than .02 per cent. sulphur. In some cases it has been found, following the application of sulphur, the yield has been increased by 300 per cent. to 400 per cent.

Sulphur aids nitrogen fixation. The fact that sulphur and phosphate deficiency are so closely related has been masked by the fact that superphosphate, 10 per cent. sulphur, sulphate of ammonia, 24 per cent. sulphur, and potash, 18 per cent. sulphur, all supply portion of the soil requirements.

Process of Making Sulphuric Acid.—Sulphuric acid is almost exclusively prepared by two methods, the Chamber and Contact processes. The foundation of the Chamber process was laid down by Ward about 1740, who prepared sulphuric acid by burning small charges of sulphur and salt petre in the presence of water under a glass bell.

Chamber Process.—A charge of crude sulphur is fed into a rotary sulphur burner, then lit. The sulphur rapidly becomes a molten mass, and as the burner slowly rotates the gasses are drawn off and passed through earthenware pipes to a series of large acid towers, made wholly of lead. By the use of oxide of nitrogen as a catalyst, these gasses are converted from di-oxide to the tri-oxide form. It combines with water sprayed into chambers and after a complex series of reactions, sulphuric acid is formed as a fine mist, which falls to the bottom of the acid chambers.

Contact Process.—In this process a finely divided solid, such as platinum, vanadium, or iron oxide, at a suitable temperature, is used as catalyst. Before passing over the catalyst the sulphur dioxide as a gas must be free from dust and impurities, such as chlorine and arsenic, which would poison the Catalyst mass. As no water is necessary, a very strong acid is produced by this process.

Field Tests of Application of Sulphur to the Land.

Sulphur has been used to condition soils in the Murray Irrigation areas where the soils are alkaline.

The most obstinate cases of "soil set" have been overcome by treatment with agriculture sulphur. Soils that were "too sticky" to plough when wet, and "too hard" when dry, have become easily workable in a month or two after broadcasting 10cwts. to 15cwts. of sulphur per acre. In less obstinate cases the sulphur may first be mixed with an equal weight of gypsum. This mixture (50 per cent. sulphur, 50 per cent. gypsum) can be applied at the rate of 10-12cwts. per acre according to condition of the soil to be treated, and will be found to work with quicker and more lasting effect than gypsum, or more economical than sulphur, either used separately.

I am indebted to the Adelaide Chemical & Fertiliser Co. for booklets and information freely and fully supplied. Professor Prescott of the Waite Institute posted me a copy of "Bacteriological Oxidation of Sulphur in an Australian Soil" by Miss P. Rountree.

The summary points out that a member of the "Thiobacillus" group of soil bacteria has been isolated from sulphur treated soil and its growth in sterilised soil studied. By its action the pH value of the soil changed from 8.4 to 4.5 in 12 days, at which point the large amount of acid accumulated in the soil appears to be the factor limiting further growth.

Further experiments in the application of sulphur to our soils would appear interesting and desirable. As a matter of interest 100lbs. of sulphur are used in the production of:—1,000lbs. of black powder, 3,230galls. cracked gasoline, 420galls. to 3,230galls. kerosene, 420galls. to 2,100galls. lubricants, 38.5galls. to 32deg. Be.lime sulphur, 250lbs. of hard rubber, 5,000lbs. of soft rubber, 727lbs. to 1,000lbs. of sulphide pulp. It has also been estimated that approximately 35lbs. of sulphur are used in the fabrication of a motor car.

Irrigation

[L. W. ANDREW, Waikerie (River Murray Fruitgrowers' Conference).]

Investigations and general observations indicate that the present irrigation practices in the Murray Valley have much improved during the last 4 or 5 years, yet in many instances they are far from satisfactory, chiefly on account of a number of individual irrigationists failing to realise when they are applying a superfluous amount of water and the damage done by applying it. In the past there have been difficulties due to prolonged periods between irrigations, and some growers seem to have the opinion that an over-supply of water when receiving it will overcome the difficulty and make provision for the future, with the result that salt and seepage problems have become their portion and their neighbour's also. The authority for deciding the periods at which irrigation water is made available to the Murray Valley Irrigation Settlements is usually vested in local Advisory Boards in conjunction with the local Irrigation Officer, and sanctioned by the Director of the Department.

The problems of adequate and economical irrigation are:—(1) The periodicity of irrigation, which is fixed by the authorities; (2) the method of irrigation, which is the matter of the grower. In the first place it is an impossibility for the Advisory Board to fix the irrigations to suit all growers. Presuming that an irrigation takes 4 weeks to complete, some growers must of necessity receive water before they are really in need of it in order that the last man does not suffer.

The Time of Irrigations.

First—The winter irrigation (August) should be completed early to allow the grower sufficient time to plough and apply manures before the critical frost period. It is essential that this work be completed (particularly in the frost zone) a week or more prior to bud burst. Settlements vary in the number of irrigations available, but where we have only 4 general irrigations there must of necessity be a long period between the first and second general irrigation to enable the fixing of much shorter periods at the critical time.

Second irrigation, early November: Whilst it may be advisable to avoid the application of water at the flowering and setting period, it is not always possible, and some growers usually have to apply it at that period. I believe little harm is done, provided the losses of soil moisture have not been too great prior to the irrigation.

Third irrigation, mid-December: It is just possible that at this stage the losses of soil moisture are at a maximum, and long periods must be avoided to ensure a maximum crop.

Fourth irrigation, mid to late January: In many instances this irrigation is too late to be of use to the currant crop and also to a portion of the sultanas, but the later varieties derive much benefit from same. Each individual settlement and holding produces a variety of crops, deciduous and evergreen, perennial and annual. This results in varying seasonal requirements, particularly at periods of crop maturity. Long periods between the dates of delivery of water at a critical time are very detrimental and often result in much loss to the grower. A logical method of relief would be to shorten the period of the community irrigation, which can be secured by the adoption of quicker methods on the blocks themselves.

After all the scientific investigation and information that has been made available to growers on irrigation problems, one fails to understand why some will still continue to irrigate as they do by applying so much water at any one time. Where the multiple furrow system is used, the excessive length of time running water in that furrow is where much damage is done. The art of watering under such a method is to get the water to the footland as quickly as possible without unduly washing the soil at the headland, and then reducing it to a soaking rate and leave it running only long enough to wet the root zone.

In many instances in sandy soil it has been proved that 2 hours is quite sufficient, and in the majority of cases anything in excess of 3 hours' soaking in 1 furrow and the grower is courting trouble for himself and his neighbours. The flooding method is adopted usually on a heavy type of soil, and a much longer time for soakage is required. Undoubtedly greater efficiency can be obtained by the spray system, as it results in a more even distribution and enables the settler to safeguard against excessive applications, but such a system is at present considered quite impracticable for general use. Even at present a number are using the spray system on a portion of their orchards with great success.

What is needed in the majority of cases to-day is:—(1) More frequent irrigations; (2) a shortening of the length of furrow; (3) a more even distribution of the water; (4) a material reduction in the amount of water applied.

A closer approach to the minimum requirements represents, in the first place, a saving in the distribution costs; secondly, the productivity of the land is preserved to a greater degree. During the Council for Scientific and Industrial Research experimental tests carried out in the Waikerie Irrigation Area over a period of 4 years, 3 to 4 acre inches of water were applied each irrigation, with quite satisfactory results (the average over the settlement being 6in. to 7in.). With the application of this quantity of water, applied in 4 furrows to the row, it was discovered that the lateral spread was complete and the moisture had penetrated to a safe distance below the main feeding zone.

If growers would occasionally dig a trench across the furrows after an irrigation and investigate the rate and depth of percolation, and also install perforated pipes enabling them to read the depth of the watertable and the rate of soakage, it would reveal so much that greater care would be taken in the application of water.

Much is being spent to-day on the drainage of surplus water from these irrigated areas, the greater portion of which should never have been put there. If the Department spent more in policing the water and instructing the irrigationists and seeing that not more than a reasonable amount was applied (and particularly the time in a furrow) they would have to spend less on the drainage of free water.

In spite of all that one may stress regarding the care that should be taken in the application of water, it is essential that we provide for an adequate supply of soil moisture at all times for citrus, and during the period of vegetative activity for deciduous plants, and to provide for withholding irrigations while fruits are ripening, and also during the critical period of flowering and setting as far as possible.

Papers Read at Branch Meetings

Cement Concrete and its Application to Farm and Station.

[Paper read by W. S. B. Moore, representative of a cement company, to the Lobethal Agricultural Bureau.]

Cement and concrete are not new products for cementing materials. The Egyptians in building the Pyramids used a cementing mixture of some kind and the Romans built structures that endure to-day, as instanced by the Roman Wall at Wallsend, which divides what is now England and Scotland. This however, was a mixture of volcanic ash and lime.

The first attempt to prepare a mixture that would set under water was made by Smeaton, an English engineer, about 1760, in the construction of the Eddystone Lighthouse, but it was left to one, Joseph Aspdin of Leeds, England, to take out a patent for the manufacture of cement as we know it to-day. This was in the year 1824. The chemical reactions involved in the setting of cement are somewhat complicated, and it will be sufficient to say that cement in combination with water forms a paste which, given time and proper treatment, will hold together sand and stones for all time.

Concrete may be defined "as a mass of fine and coarse materials, known as aggregates, which are surrounded by a hardened cement paste." It will be strong if the aggregates are strong and the paste is strong, and it will be watertight if the paste is watertight. The important point to remember is that the strength of the concrete depends within certain limits on the amount of water used in mixing it, and the amount of water used depends very largely on the class of sand and metal used in its preparation. In general the finer the aggregates the greater the amount of water required to produce a workable mixture and the weaker the resulting concrete. That is why fine sands should be avoided and why the best concrete sands are those in which the size of the particles ranges from fine to coarse according to a well defined scheme.

Before commencing to prepare any concrete the following points should be noted:—

(1) *Cement.*—Any reputable brand will be found satisfactory.

(2) *Water.*—Water that is clean and free from oil, alkali or acid is suitable; in general, that which is good enough for all domestic purposes. No more should be used than will produce a workable mixture: avoid sloppy concrete.

(3) *The Aggregates.*—It is usual to divide these into two classes, the fine and the coarse. A combined aggregate designed by Nature to meet all requirements is rare, and in order to ascertain that the aggregate on a property is suitable it is suggested that a sample be sent to a local cement company who will test it free of charge and report on its suitability.

Where no such ideal mixture exists, it will be necessary to sieve such materials as are available and later combine in the best proportion. Very often it may be necessary to wash out excess fine material, the presence of which may be deleterious to the concrete. The sand should be sieved through a ¼in. screen, and the coarse aggregate should range in size from ¼in. to 1½in., depending on the type of work in hand. It is recommended that the largest pieces of coarse aggregates should never exceed one-third of the thickness of concrete being placed.

The best aggregates are those which are sound, hard and durable. If the material is soft or flaky or will weather badly it should not be used. In addition, the best aggregates are clean and free from fine dust, loam, clay or vegetable matter. Concrete made with dirty aggregates hardens slowly and in fact may never harden enough to serve its intended purpose. There are, of course, certain standard methods of testing aggregates, all of which are simple enough.

(4) *Proportioning Concrete.*—The usual proportions are 1:2:3, 1:4:4, 1:2½:5, and so on. No very definite lines can be laid down, owing to variations in the grading of the aggregates, but the aggregates should be so mixed as to produce ultimately a dense mixture and one which requires the least water to produce a workable mixture. Experimental batches of varying proportions are recommended in order to determine which mixture gives the best results. One which requires approximately 5galls. of water per bag of cement in order to produce workable concrete will be excellent. Some allowance may have to be made for moisture variations in the sand, but this would be simple enough. A good, dense concrete is aimed at; mix the materials accordingly.

(5) *Mixing.*—Having arranged a suitable mixing board, the cement and sand in accurate proportion are dumped thereon. These are turned over thoroughly until the mass is of a uniform colour and free from streaks. The coarse aggregate is then added and the mass again turned over dry until a uniform colour is obtained. A depression is then made in the centre of the pile, the correct amount of water added, and mixing is continued until uniformity is obtained. In general, the longer this operation continues the better, as not only is greater strength developed but plasticity and workability are improved, the labour of placing is reduced, and a more watertight concrete is obtained. Where concrete mixers are available the mixing might be continued for at least two minutes after all materials are in the mixer.

(6) *Placing the Concrete.*—The newly mixed concrete has now to be placed in forms, and this should be done as soon as possible after mixing. No such concrete should ever be placed on an absorbent base, as all the water used in mixing will be required to complete the chemical reactions in setting.

This point is important and should be noted carefully. It is usual to oil forms before concrete is deposited in order to facilitate their removal afterwards. As the concrete is placed it is spaded into position and tamped so that a dense concrete results.

Spading also helps to ensure an even surface when the forms are removed. The consistency of the concrete should be such as to prevent segregation of the aggregates and any tendency towards a final honeycomb finish.

(7) *Finishing.*—There are various methods of finishing concrete, depending on

the type of finish required. For such things as fence posts, feed troughs and so on it will be sufficient to screed off the surface until it is level. For floors and footpaths a wooden float is recommended, the finishing being done at such a stage in the setting of the concrete as will enable the finish to remain permanent. To provide a very smooth surface some tradesmen use a steel trowel. There is, however, an art in its use and the practice is not recommended. In trowelling in this way there is always a tendency to work fine materials to the surface which may cause dusting or the development of hair cracks. Sometimes surface water appears on the surface of the concrete, but this should be avoided if possible. It should be allowed to evaporate before finishing, or it should be brushed off. It is never considered good practice to sprinkle dry cement to take up water.

(8) *Curing.*—The last and most important phase in making good concrete is to provide proper curing conditions. Cement will not continue to harden unless water is present, so that curing increases both the strength and wearing properties. There are various ways of keeping concrete moist, most of which are fairly obvious, *e.g.*, wet bags, sand, &c. Fourteen days should be the minimum time before exposure to normal atmosphere.

Having made good concrete it is simple enough to mould it into any shape required whether it be fence posts, feed troughs, floors, tanks, building blocks or any of the hundred and one uses to which it may be put.

Pinnaroo.

[A. O. Nietz (Pinnaroo).]

Story of the District.—In pre-miocence times, South Australia was a large area stretching far to the south of its present coastline. In time, it was eroded to a peneplain. In mid-miocene times, about 12 million years ago, the sea invaded the land, and this area and other parts of the State were covered by the sea. Marine invertebrates dropped to the bottom, and the old peneplain was coated with a layer of limestone. In the post-miocene period, which included a very wet era, when much alluvium was deposited, there was a gradual rising movement. This was greater in the west, and gave rise to the Marmon Jabuk Range, and less in the east, where the limestone is only found at a depth of about 200 feet, having an overburden of clays and sands. To the west there is much limestone on the surface, but around Pinnaroo only a shelf of travertine limestone is to be found—in fact, there is no stone on or near the surface. This may have its advantages to the farmer, but it means that metal for roads, etc., has to be brought by rail for about fifty miles from Peak or Jabuk. The travertine limestone is only a thin layer, and gives—in places—a marl which is useful for paths or for binding on roads. It contains some hard pieces of limestone, but these are small and useless for buildings or road making.

Buildings.—The bed of clay predominates and gives rise to the so-called "Bay of Biscay" land. The buildings are liable to crack, owing to seasonal variations in the condition of the soil. Because of this, and also because no building stone or bricks are available close at hand, there are many wood-and-iron buildings in the town. The majority of public and government buildings are, however, of brick, but these are usually well strapped with girders and iron bars. As has been mentioned, Hillcrest is built on a sand ridge, and here a number of fine stone houses have been erected. The various strata passed through when sinking the Government bore showed a thickness of clay of 42ft., sands 180ft., and limestones 400ft. Many fossils and shells have been brought to the surface when bores have been sunk, especially from the sand layer. This shows clearly that this area was once under the sea.

Soils.—The soils in the county vary considerably. The best agricultural land consists of red to black clay loam flats with clay sub-soils. In good rainfall seasons these flats are capable of producing heavy yields of wheat, but they fail badly in dry seasons. The flats vary in size, some running to hundreds of acres. They are divided by sandhills which have a poor quality surface soil with clay subsoils at depths varying from a few inches to several feet. These sandy ridges usually run east and west, and are often miles in length. It is this fact which makes the construction of north-south roads difficult—they often have to cross one ridge after the other. The "Dingo Ranges" are probably the biggest of these ridges; they extend for many miles, and in places rise 100ft. above the flats.

As we go north from Pinnaroo we come to the more recently settled areas where not only is the rainfall lower, but there is a bigger proportion of sandy soils. To the south of Pinnaroo, the rainfall is heavier, but this portion includes much rough country, and becomes sandier and sandier —it is the northern boundary of "The Desert". Towards the west there are many long gradual slopes with a shallow, light-coloured sandy surface soil over a very retentive clay. In recent years these slopes have produced some good crops, but it is said that they do not yield so well in wetter seasons. Limestone appears at the surface in the extreme west of the county, and there the land is not of such high quality.

Rainfall.—The average rainfall at Pinnaroo is 14.19in. The rainfall increases to the west, as is shown by these averages:—Pinnaroo 14.19in., Lameroo 15.79in. Geranium 16.39in. Except for the years 1910, 1917, 1919, and 1921, the total rainfall for Lameroo has been in excess of that for Pinnaroo. In these years, Pinnaroo had heavy summer rains, the totals for the 3 months, January, February and March being:—

Year	Lameroo.	Pinnaroo.	Excess at Pinnaroo.
1910	4.21	7.02	2.81
1917	2.06	2.15	.09
1919	2.55	4.09	1.54
1921	3.96	8.94	4.98

This proves that in each year the winter rainfall at Pinnaroo is lower than at Lameroo. In the 13 years since 1924 only one year, 1930, has reached the average, while in the 17 preceding years, 11 years were above the average. Many of the drier years have opened splendidly but the fall has unfortunately been light in the spring. It is the months of October and November that worry the Pinnaroo farmer.

The average monthly rainfall figures for Adelaide and Pinnaroo show that there is little difference from November to March, but that Adelaide has, on an average, more than 1in. per month more than Pinnaroo during the winter months. It is well known that southern South Australia depends on the cyclonic and anti-cyclonic systems for its winter rainfall. They move in an easterly direction, and Adelaide is on the west of the Mount Lofty Ranges and Pinnaroo is on the east. Though Pinnaroo is not exactly in the rain shadow of this range, many disturbances which bring rain to Adelaide bring only cold dry winds to Pinnaroo. During June and July, Adelaide receives much rain during cold showery weather with south-west and south winds. Pinnaroo has few showery days, and once the wind has turned to the south-west, very little rain falls. Similarly in the summer months, Adelaide sometimes has a cool change which completely misses Pinnaroo. The Pinnaroo farmer likes to see rain falling when the wind is in the east. Usually this means rain without ceasing for twelve hours or so. Pinnaroo being an inland town, has greater variations in temperature than Adelaide. The winter is delightful; clear cold frosty nights followed by days of warm sunshine are the rule. The summer temperatures are similar to those of Adelaide, but the nights are cooler. Dust, however, is much worse than in the metropolis, owing to the drift from the sand ridges. Farmers are seldom delayed when harvesting by wet weather. If more rain were to fall in June, July, and especially in October, the climate would be ideal for wheat production.

Water Supply.—I know of no creek or regular water course in the whole county. Even during a heavy rain there is no flow of any dimensions. The water lies in flats and hollows and forms small, shallow pools. These may hold water for weeks, but as a rule few pools remain for more than three or four days after an average fall. The shallowness of the water, due to the flatness of the land, exposes a large area for evaporation, while much water finds its way to the depths below through "crab-holes," which are liable to open up anywhere.

The lack of surface water increases the value of the sub-artesian supplies, for fortunately Pinnaroo is situated over the Murray Artesian Basin, and water is found at even shallow levels. I know of only two dams in the district. One is at Scrubby Springs and was built by the early pastoralists, and is no longer used. The other is the railway dam at Pinnaroo. This dam was constructed because the artesian water was found to be unsuitable for use in the locomotives but, on better water being obtained at greater depths, the dam is no longer used.

Instead of a dam, each farm has its bore, so that windmills are a distinct characteristic of the district. Instead of a reservoir to supply the town, there is a government bore. Across the border windmills are an even more common sight, as the Victorian Government has put down a bore every three miles along some of their roads. Few farmers have mechanical pumps; they rely entirely upon the force of the wind to raise the water. It sometimes happens that there is a prolonged calm, storage tanks are emptied and sheep and cattle have to be driven to the town supply of water. This does not occur very often; otherwise, no doubt, engines would be installed. Water is found at various depths, and as the figures are very similar throughout, the town bore may be taken as a standard.

Water was first struck at a depth of 235ft. and rose to 230ft. when struck. It is this supply which is drawn on by most of the bores. The water is good for stock and domestic purposes, but this is the water that was found unsuitable for the railway engines. The water is in the marine tertiary limestone. The second supply was struck at a depth of 510ft. in the Polyzoal limestone which has a honeycomb appearance. This water rose to a depth of 217ft. and is better than the first supply, containing only ⅛oz. solid matter per gallon. A third supply was reached in the grey porous limestone at a depth of 515ft. This rose to 212ft., and is excellent water. It is the source of the town supply and is used by the railways. The solids per gallon are only .12oz. The underground supply must be enormous, as the pumps, pumping up 7,000galls. per hour for 24 hours without a stop, do not lower the level in the pipe. A big tower 100ft. high stores 100,000galls. for the use of townsfolk. Many of the residents are keen floriculturists. The bore was sunk in 1927, and there seems to have been no alteration in water levels in the 10 years it has been in use. Dry or wet seasons do not alter the level, but I have been told that the level does vary with seasons, in bores further to the south.

Mount Compass Schoolboys' Potato Competition—1938.

[H. H. ORCHARD, District Horticultural Adviser.]

This competition, promoted by the local Branch of the Agricultural Bureau, has now been running seven years. Messrs. Pitt Bros., of Ashbourne, again presented the seed, and each boy received eight potatoes weighing 1lb.

A single potato top from the winning plot which weighed 32lbs. and produced 15¾lbs. of potatoes.

Planting was done on October 26, 1937, and digging on March 10, 1938. The number of sets planted averaged 77 and the average of the plants dug was 63.

Don Jacobs obtained 369lbs. from his plot of 602 sq. ft., equal to 4½lbs. per set and 11 tons 18½cwts. per acre, which was the best acreage rate in addition to the highest yield. The fertilisers used comprised fowl manure, bonedust, 45 per cent. superphosphate and sulphate of ammonia, and cost approximately 5s. 10d.

Kenneth Ekers secured second highest yield with 354lbs., equal to 4½lbs. per set and 9 tons per acre, and the tubers were awarded the prize for the best commercial sample. One potato top in the plot weighed 32lbs. and the potatoes under it 15¼lbs. The fertilisers used cost approximately 6s. 2d., and comprised fowl manure, 45 per cent. superphosphate and blood and bone manure. The following are the yields obtained:—

Yields in Mount Compass Schoolboys' Potato Competition, 1938.

Competitor.	Sets dug.	Yield lbs.	Yield per acre. tons.	cwts.
Don Jacobs	82	369	11	18½
Kenneth Ekers ..	74	354	9	0
Linton Jacobs ..	66	319	11	3
Kevin Harris . ..	72	218	10	17
Douglas Chigwidden	50	178	8	3
Keith Curnow . ..	55	163	4	5
Stanley Curnow ..	56	139	3	10
Colin Curnow . ..	50	87	2	6½
Average	63	228 lbs.		

Previous winners of highest yields have been:—

Year.	Winner.	Yield. lbs.
1932	Kelvin Peters	108
1933	Linton Jacobs	217
1934	Don McKinlay	278
1935	Don McKinlay	270
1936	Linton Jacobs	438
1937	Linton Jacobs	603

The Benefit of Heavier Dressings of Superphosphate.

[CLIFF. RODDA (Boor's Plains).]

It is a noteworthy fact that practically all Australian soils and most other soils of the world are deficient in phosphoric acid which is an important plant food. Professor J. D. Custance, the first Principal of Roseworthy Agricultural College, proved from experiments conducted by him at the college that an application of superphosphate was the best way of making up the deficiency in our soils.

This very important discovery was really a turning point in Australian agriculture. At that time cereal growing was not profitable, but even light dressings of superphosphate gave such good results that the farming industry was put on a firm basis.

Cereals receive most benefit from superphosphate during the first six weeks of growth, as it encourages stronger root development and makes the plants more vigorous, and thus more able to resist disease. It also hastens the maturity of the crop, which is an advantage in low rainfall country and in districts where the hot weather comes in early.

In heavier rainfall areas much heavier dressings of superphosphate can be economically applied than in the drier areas, and much experimental work has been done by the Department of Agriculture to determine the most economical application. From figures published by Mr. R. C. Scott (Chief Agricultural Adviser) 153 experiments conducted all over the State over a long period show that "no manure" plots averaged 11.3bush. per acre ½cwt 14.28bush., 1cwt. 15.57bush., and 2cwts. 17.03bush. per acre. Therefore the dressing of 2cwts. was the most economical with wheat at 4s. per bushel. In districts of less than 13in. rainfall 1cwt. per acre is recommended, and over 13in. up to 2cwts. should be applied.

In dry years cereal crops may not use the whole of a heavy application of phosphate, but it is not wasted, but remains in the soil, and greatly encourages pasture growth in subsequent years, which means more and better fodder for livestock. It has been proved that stock are healthier when grazed on pasture fertilised with superphosphate, as it contains more phosphate of lime which is important for the health of all animals.

Super greatly encourages the growth of clovers, which provide abundant feed, and also build up the nitrogen content of the soil, and this in turn encourages much better cereal crops. Wonderful results have been obtained by the application of superphosphate to sown pasture lands and in many instances the stock-carrying capacity has been increased from one sheep per acre to five or six, and much land in our South-East which seemed to be practically valueless before being top dressed is now producing quite good pasture.

Old Pastures, Weeds, and Erosion.

[W. J. White (Port Elliot).]

My remarks will more or less be confined to the type of sandy loam varying in depth from 6in. to 1ft. overlying a clay subsoil. which is typical of vast areas south of Adelaide. Only a few years ago it was generally understood that if this country was cleared of its timber, viz., blue gum and pink gum, either by axe or roller where possible, and sown down to clover and top-dressed annually with superphosphate, all was well. That is certainly true temporarily. It is a simple matter by this means to increase the carrying capacity from a mere nothing to, say, three sheep to the acre. (I am speaking of a holding all of which is cleared to the stump and brought into production). Immediately clovers are established and top-dressed annually a change begins to take place in the soil. Although unnoticed perhaps for several years it is surely going on all the time, until the soil becomes so rich in nitrogen, which is placed there by the annual growth of a wealth of clover and increased stocking, particularly with sheep, that the clover begins to disappear, and other grasses, such as silver grass and brome, are encouraged by the excessive nitrogen now in the soil. Later, again, these grasses give way to Cape weed (dandelion). By this time all the root system of the natural growth originally on the land has rotted and decayed. This, together with the droppings from the increased stock carried, forms a new surface on the soil, which has taken years to build up. At this stage the change in the condition of the soil is very conspicuous, and then dandelion begins to take charge. Often when I complain of this weed being a nuisance, I am told what a wonderful feed it is. That is true, but to a very limited extent. Certainly stock do relish it at different times of the year, and they do well on it as hay, provided it is put into the stack in good condition. This is very often difficult. It is very unpalatable during the wet season, and I say it is a nuisance, because it dries off so quickly, before any of the other grasses, and having no root system when it is dry to bind it to the soil, it disappears very quickly, leaving the paddocks bare, and the surface soil, which is so important in maintaining the increased carrying capacity, is left to the mercy of the winds. This is when it is necessary to have substantial supplies of conserved fodder on hand to maintain the stock in good condition.

What is going to happen in the near future if these conditions are allowed to prevail without any attempt to remedy them? The heavy stocking at least during the summer and autumn must be reduced, because sheep can do a great deal of damage to the soil during this time of the year. This seems to be a step back, in spite of what scientific research has achieved in recent years. One wonders whether this land is permanently suited to the heavy stocking that we so often hear about. Under present conditions I venture to say that it is not.

A great deal is being done at present to overcome these pasture problems, and the problems of stock diseases which accompany heavy stocking, and of which we hear something new every little while. Many suggestions are made as solutions for pasture problems; some of them are economically impossible, some as yet untried. I do not believe that forcing big numbers of sheep on small areas of dandelion before it seeds will combat the nuisance, and the sheep will suffer as a result.

The use of the mower is by far the better method. By this means ensilage can be made from small areas each year, but from my experience this is by no means a complete solution of the problem, although it will help temporarily.

Subterranean clover is too valuable to us to lose, so we must endeavour to find some grass or grasses that are suited to our type of soil and climatic conditions, and one that will thrive with clover, and so help to maintain a better balanced pasture. It is yet too early for me to say positively what these grasses should be. Perennial Rye seems to be the most likely so far, but time alone will prove whether this grass will survive our summer drought conditions. If it does, it has quite a lot to commend itself, because, apart from providing good winter feed, it makes excellent hay and provides a green picking during the summer, which is of great importance; and, above all, it has a root system which will prevent erosion.

Whatever we do, a better system of pasture management is essential if we are to obtain the maximum results from our holdings and still keep our stock healthy. The holdings must be subdivided into small areas and a system of rotational grazing practised. The land must be freed of stumps, so that the mower can be used wherever necessary. It is not a wise plan to conserve fodder from the same area each year. The grass that the stock cannot consume before late summer should be stacked and fed out later.

The problem here is that we have so little time in which to get this hay into the stack in good condition. I am inclined to think that to keep abreast of the changing conditions we shall have to mechanise the whole of our methods. Whether this is economically possible in the light of the unstabilised world markets I am not prepared to say.

Charcoal Burning.

[K. N. Gillen (Yadnarie).]

Coal of some description is a necessity for blacksmithing on a farm. Good charcoal mixed with a small quantity of coal or coke is ideal for heating purposes. It is a common thing to see tons of stumps being burnt to ashes in the paddock, whereas these stumps could be burnt into charcoal. There is hardly any expense attached to the burning of it, and only a little extra labour is required.

The best and most suitable method is to burn the charcoal in pits. In this way the gas stays in the charcoal and thus gives the heat which is necessary for blacksmithing. When making the pits care should be taken to sink them in size according to the galvanized iron which you possess; otherwise there will be difficulty in covering them. The most suitable pit would be one 7ft. long, 3ft. 6in. wide, and 5ft. deep. In this case two 8ft. sheets of iron would be used for covering them, as it is necessary to have a slight overlap on the pit. Always have a fair quantity of stumps nearby, as when burning it will mean less handling.

To Burn.

Firstly, a small fire is lit at the bottom of the pit. When burning freely keep adding a layer of stumps until the pit is full. Big stumps are preferable for the bottom layer with small stumps on the top. The top layer of stumps has less chance of burning than the bottom. The top layer can be heaped well above the pit, as when the time for covering arrives it is usually found that they are burnt well below the level of the pit. The stumps burn for approximately 2 hours, and this is of great importance; if they burn too long it will be found when opening the pit that they are in the form of ashes or partly burnt stumps. A great deal about the burning depends upon the weather. On a windy day they burn more freely, and naturally the pit would be covered much sooner. Also, if allowed to burn too long the charcoal will be found to be very sparky when used. That is why it is recommended to use with it a small quantity of coal or coke.

To Cover the Pit.

Place 2 iron bars across the pit, and on these place the 2 sheets of iron. Then cover with cinders or sand, leaving 6 air-holes, allowing a certain amount of the gas to escape and preventing the pit from blowing to pieces. Cinders are preferable to sand for covering.

Leave the pit covered for at least 3 days. When opening, discard cinders and iron, taking care not to allow the cinders to fall into the charcoal.

Have a large sieve made on a stand with a bagger attached and place it near the pit. The charcoal can be shovelled on to the sieve from inside the pit. If carried out this way it will be found the charcoal will easily be kept clean, and the remains can be used for covering the next pit. Also, when in the blacksmith's shop one will have no difficulty in the forge ceasing to blow.

Forage Grasses.

THEIR VALUE TO THE FARMER.

In the course of a paper read at the June meeting of the Hartley Branch, Mr. C. J. Faehrmann stated:—

Our meadows and pastures, though many appear natural, are really the results of man's care and industry, as are the wheat fields, and in properly managed pastures the farmer should grow only such grasses as experience has taught are most useful and nourishing when used for fodder or cattle food. Some of the most valuable grasses grown as fodder plants are the varieties of rye grass. This is a very hardy plant, and any amount of "feeding off" does not harm it, but tends to make it grow more strongly. The fescues are also an important group. There is a variety of species of these, and they are suited to all kinds of soils and climates. These make good hay. Grasses, such as cocksfoot need to be cut before flowering, because the stems become hard and woody, and do not appeal to stock.

Most grasses are perennials, coming up year after year, but a few are annuals. Their flowers are born on spikes, like those of wheat and oats. A study of the grasses appearing on a patch of ground over a period of years will show how various plants predominate in rotation each year, probably due to climatic changes, rainfall, and depth of water in the soil. Grass is able to adapt itself to almost any condition and survive. In most cases it is "the survival of the fittest." Compare the dandelion and the rye grass. Which survives?

Among valuable forage plants are found many of the leguminous family—the family of peas, beans, vetches, and lotuses. Chief among these are the clovers, which are grown for hay and green fodder purposes. The Subterranean, White, Dutch, Italian, Red, Alsike, and the Medics are to be found locally in most pastures, and provide a valuable fodder for sheep and cattle, and are extremely valuable in providing nitrogen for the enrichment of the soil. Sainfoin and vetches are other leguminous plants producing the same effects.

The lucerne plant needs no introduction. One of its chief characteristics is its tendency to send its roots down until they reach water, and in doing so it makes the soil spongy enough to held the water when rain falls. Being deep rooted, it thrives in dry soils and in places where droughts are common. It also enriches the soil, and is capable of being cut several times throughout the year. Once established it will last for years, needing little attention on the part of the farmer. Carefully dried it makes an excellent hay.

Various methods of storing cut grasses are in use, viz., the haystack and the silo. The following points should be of interest: —Grass dried in the sun and wind is hay, and provides nourishing winter food for animals, but if, after being cut, it is allowed to lie too long exposed to the sun and wind its nutritious value, fragrance and colour are diminished. Fragrance is important, as it makes food palatable to stock. Grass to be used for hay should be cut in full vigour and bloom. Rain following and falling on the cut grass is detrimental, as it washes out the constituents of the sugar, gum, and albumen, and if left too long fermentation sets in and turns the sugars into alcohol. The silo is becoming increasingly popular, and the ensilage is proving a valuable food for animals on account of its medicinal properties.

With careful selection and judicious management the grasses grown locally in our 14in.-16in. rainfall could be improved. The first problem is the removal of the loose surface stones, which in this district must cover a large percentage of the grass areas on the smaller holdings.

Experiments that I have carried out with grasses over a period of the last seven years under natural conditions in this district have revealed those grasses which would be profitable to introduce into our paddocks, and some that it would not pay to persevere with.

About 40 varieties have been tried out annually, and most of them show some tendency to germinate readily, but those outstanding include all kinds of clovers, although the ground is rather hard for those of the Subterranean variety to establish themselves by seeding.

Grasses that would be well worth trying include varieties such as Sheep's Burnett, Cocksfoot, Papsalum, *Phalaris tuberosa*, Tall and Chewing's Fescues. Rye Grasses (Wimmera, Perennial, Italian, and particularly Colac Rye Grass) could be definitely recommended as grasses of special value in this district. Sanfoin, lotuses and vetches also grow well. Sheep's Burnett should prove particularly valuable, as it keeps green right through the dry summer months, seeds well, quickly establishes itself, and is certainly drought resistant. Planted around fences, it should make a good firebreak.

Several varieties of saltbush have been tried, but to date the only ones to establish themselves permanently are the varieties "Old Man" and *Atriplex semi-Baccata* and *Atriplex angulata*.

Plots containing combinations of grasses have been tried out, and the varieties of Rye Grass, Sheep's Burnett, Cocksfoot, and Toowoomba Canary Grass (*Phalaris tuberosa*) have definitely outgrown the other plants.

The grasses were sown on a hard seed bed at a depth of 1in. prior to the early autumn rains, and this year's quota are doing as well as those of previous years. An application of superphosphate (about 1cwt.) is given after the seeds have grown for three or four weeks. It would be interesting to try out, in paddocks where stock are continually grazing, the suitability of the grasses mentioned above when fed off regularly, as an adjunct to the feed now available, and to ascertain their value as a stock fodder. Helpful information concerning these grasses is always available from the Department of Agriculture or any of its District Advisers.

There is nothing more necessary than an abundant supply of grass to assist in preventing the much-talked-of soil erosion—a problem that is increasing annually, and causing vital concern in many parts of the world, no more than in Australia. The need for improved pastures in this district was never more apparent than it is this season, notwithstanding the splendid opening.

Swings and Chains.

[O. TALBOT (Maltee).]

A set of swings and their order of arrangement is something that can be varied to advantage. A decrepit set will usually cause much inconvenience and loss of time to the teamster, to say nothing of the discomfort given to the horse. Therefore, a day or two given to a general overhaul before the commencement of a season's operations is usually time well spent.

Firstly the chains should be examined and freed from "wire-links," etc., as these will often rub a horse if in a position to do so besides being an unreliable repair.

Also several big links should be fixed to the ends, making both chains of an even length and allowing them to be fitted easily and quickly to the hame hook.

For the joining of chains, the riveted type of "repair" link seems the best, as this is of an even thickness and not bulky on one end, as is the ordinary split-link.

Then the swings should be looked to and those in an unsound condition replaced by new ones, and all loose eye-bolts, etc., tightened up. The single-horse swing should be of sufficient width to allow comfort, and in cases of a mare in foal plenty of room should be given. It is a good idea for each horse to have its own swing and chains for all occasions, made to measure, as it were.

Then the two-horse swing should be wide enough to allow the horses to walk in comfort. Too much overlap of the chains will cause sore legs and give the horse a tendency to walk awkwardly in an effort to keep clear.

A ring may be used in place of the centre eye-bolt on this swing, as an eye-bolt will sometimes be twisted off by one horse plunging ahead of the other and thereby taking all the pull.

Above a two-horse swing a spreader is best used and if it is fitted with a chain and adjustable big link a little more advantage may be given to the weaker horse. A chain adaption is also an advantage on the main spreader, as the same chain may be used for several different sized teams and is quite easily altered to correspond.

In cases where an implement with a low pulling draft is worked in stumps an iron slide bent half-round and fixed to each end of the main spreader with a U bolt, will often save a breakage and subsequent delay.

The swings should be all an equal distance from the implement and not with one side a considerable distance in advance of the other; this causes discomfort to the team and makes it awkward to drive.

For a team of more than seven horses, tandem is much the better idea, and for this the equalising chains are the only satisfactory method. The shoulder-swings which are attached to the body-horse allow either one to loaf by coming back only a few inches.

Care of Harness.

[O. B. Schiller (Sutherlands).]

One of many items of importance on the farm is that of selecting and caring for harness. Any kind of harness, regardless of size and shape, will not do to work on a horse that has heavy pulling to do. Every horse should have its own harness, and it should be such that it fits the horse with comfort. Winkers, collars, and saddle should go on with ease, but not be too large. Rather have the collar on the small side with the risk of choking down the horse. In most cases sore shoulders are caused by ill-fitting collars. The collar should go back on the horse's neck without pinching, but at the same time it should not be too long. If too long, the draught will be too low, pulling on the lower part of the shoulder, which will soon become sore. When a horse develops a lump or sore high up on the shoulder lower the draught of the hames. When the sore is low down raise the draught. This will generally give the sore a chance to heal while the horse is working. It may be advisable to take a round-headed hammer or a bottle and knock the collar on the spot where it has caused the sore; but always knock towards the inside of the collar; this will ease the pressure on that particular spot. If this is not sufficient to cure the sore, take several thicknesses of an old bran bag and sew it over the lining, then cut a hole where the sore comes. By this method the sore will heal while the horse is working. It also has the added advantage of leaving the lining of the collar intact.

When it is necessary to give a horse a different collar it is advisable to knock it first with a round-headed hammer, so that the stuffing becomes soft again. This allows the collar to take the shape of the horse's shoulder. All new harness should be well saturated with good neatsfoot oil before it is put in use. This soaks into the leather and preserves it against dampness and the sweat from the horse for several months. If this is not done the leather will absorb a great amount of moisture. When it dries again it will become hard and it will ultimately break. If leather is oiled at least twice a year, say, just before seeding time and harvesting time, the leather will remain pliable. Before oiling harness or other leather add a little kerosene to the oil. This will prevent rats and other vermin attacking the leather.

To make a good home-made harness dressing mix 2lbs. mutton fat with 3lbs. beeswax and heat over a slow fire. Add 4lbs. sugar, 2lbs. lampblack, 2lbs. soft soap, and ½lb. indigo. For brown harness leave out the lampblack and indigo.

When leather becomes hard and cracked apply a mixture of 2ozs. beeswax, 1oz. of lampblack, and a pint of oil. This will restore it to its former condition. If possible all harness should be kept in a separate shed alongside the stable. The general practice of keeping it in the stable is not a good one. The ammonia arising from the decaying manure has a tendency to rot leather, hemp and check. With ordinary care harness should last for 20 years.

All harness should be kept in a definite place. Nothing is more aggravating or a greater waste of time than having to look

Winner of the Mount Compass Schoolboys' Potato Competition (Ken Ekers) with the potato top from his plot weighing 32lbs.

for it first of all. It is of great importance to keep all stitching in repair. For any trifling repairs do not use rivets. Buy a saddler's awl, a few needles of various sizes, wax, and a ball of hemp, and if one intends to go in for collar lining, collar needles and a palm will be needed. The main point to be observed in stitching is to keep the two pieces to be sewn firmly in position; if no other way is practicable, they can be held together in a vice, but it is much handier to have a proper clamp. Sewing should always be done with two needles, and both needles should be pulled through at once to prevent one wearing the thread of the other. Before commencing to sew, make up several lengths of wax ends of the size required; about four strands of hemp is enough for ordinary use. The hemp should be waxed before it is twisted, then twisted to the right as tightly as possible. About 6in. at each end should be then twisted in the opposite way and the needle put on, then twist it to the right again till the needle is firmly fixed. A small piece of candle rubbed on the thread will keep it from sticking to the hands and make it run easily.

Lining collars is somewhat more difficult, but when it is done the collar can be made to fit the horse. In cutting out check for the collar it is always better to make a brown-paper pattern and fit it on the collar, then the check can be cut to the size required. Great care should be observed in putting in the hair not to leave any lump to injure the horse's shoulder. The hair should be washed and then put in an oven until thoroughly dry. It should then be chopped into short lengths. A good method of cleaning or teasing hair is to draw it between two boards from which wire nails protrude about an inch.

Trees for the Mallee Areas of Eyre Peninsula.

[A. Day (Pygery).]

In the wheatgrowing areas of the Mallee the farmer usually clears several hundred acres of scrub in one piece without leaving any native trees or scrub for shade and shelter. If any trees are left at all they are generally well past their prime and soon become old and decayed. Also many are destroyed by stock and fire, and before many years some farms have very few shade trees left. The tractor farmer in particular prefers a large clear paddock to work in; a tree of any kind is considered a nuisance. The settler when he takes up a scrub block will in most cases choose a clump of pines, black oaks, or ti-tree as the site for his homestead. In most cases these trees are old and gradually die out. In a short time they fail to serve the purpose they were meant for; in fact, many fall down on the job. All stock like good shade in summer time, and where sheep have plenty of shade to lie in in very hot weather they drink far less water than those in an unsheltered paddock. Lying out in the sun tends to make their wool dry and harsh. At shearing time freshly shorn sheep require shelter of some kind, and a patch of dense scrub is hard to beat for this purpose. At lambing time also it is a good windbreak for the young lambs.

Every farmer should endeavour to plant a few trees each year around his homestead and in corners of paddocks where they could be securely fenced from livestock and rabbits. These should be carefully tended and watered for the first two or three years. Do not plant trees too close together; give them plenty of space, and never plant a young tree near an old one. Neat, young ornamental trees around a home make it more attractive and a more pleasant place to live in. Some trees that appear to do fairly well in this district are the Sugar Gum, Tuart Gum, and New South Wales Swamp Oak. I have seen a few Tamarisk, Carob, Jacaranda, and Broadleaf or Golden Wattle growing very well. There are a lot of trees that might thrive on Eyre Peninsula if they were tried. I often wish the Forestry Department would start a nursery or plantation somewhere in Central Eyre Peninsula and give as many trees as possible a try-out; they could also supply the settlers with seeds or seedlings.

Among our native trees the Pine, the Black Oak, and Ti-tree do well, and there is a native wattle that provides a very dense shade and makes a shapely bush. Almost any of the wattles would grow here, and there are many kinds in Australia.

The Broadleaf is the wattle grown in the Adelaide hills for its bark, which has proved itself the best tanning bark in the world. Its wood is also in great demand with bakers, because of its great heating powers and it does not become sodden with rain. When in full blossom this wattle is a beautiful sight and has a very pleasant perfume. Every farmer should plant at least one or two trees every year, water and tend them for two or three years, and at the end of that time he will be amply repaid for the trouble.

Hints on Fencing under Local Conditions.

[J. ALCOCK (Penwortham).]

In erecting a fence the first thing to consider is the sight sticks. The best sticks for this purpose are iron stakes (T-iron posts) with a piece of paper rolled around the top and tied with string. For this job 3 or more posts are required. Erect them on the line. The next operation is to measure off the fence; this requires two men. A chain measure is the best to use, with one man on each end. The man leading uses a hoe or grubber to mark the distance. A line can be marked off in half-chain lengths, then using a stick or a piece of stiff wire to measure up the rest. I favour a strain of 14 posts; the best way is to make a cross mark at the end of a strain, that is, at the fourteenth half-chain panel. The next thing is the erection of a boundary or road fence. I favour posts 5ft. 6in. in length, 20in. in the ground, and the spacing of the wire from the ground 6in., 6in., 7in., 8in., 8in., and 11 in. This will give a fence of 6 wires. The 5 bottom wires may be plain and the top barbwire. If a hole is bored at the top of the post and the barb rested in it it will be found a great advantage, but it will be necessary for the barb to be tied as usual. The advantage gained by letting the wire in at the top is to prevent it from slipping off at the top of the post.

A post about 6ft. x 4in. with a strainer 6ft. 6in. long is best for the line, and 9in. at the small end. For corners and angles have the strainers 7ft. long and not less than 10in. at the small end. Cut the top of the strainer at an angle of 45deg.; this will allow the water to run off more freely instead of saturating the post and so causing it to perish more quickly. A strut 8ft. long is suggested. Strut this to the post 1ft. from the top wire. This line of posts at 11ft. apart will require 41 plain posts and 1 strainer. The quantity of wire would be about 1¼cwts. of No. 8 and 154yds. of barb. (There are 520yds. of 5½in. 12 gauge to the cwt.)

A division fence is not required to be so strong, so I would suggest using droppers; they are not so expensive and make quite a good fence. The most satisfactory dropper is the stringy bark grown in our district. Should one get broken it is quite easy to replace by stapling on another one. whereas a bent or broken iron dropper has to be left in the fence or a good deal of work is required to remove it. My reason for preferring droppers to stakes is that should stock lean on a staked fence and push it over it invariably stays there, whereas should the same thing occur with a dropper fence it usually comes back upright. For a fence of this kind the posts should be ½ chain apart with 2 droppers between. Where possible always use green timber for posts.

The Agricultural Bureau and its Advantages.

[F. H. JONES (Murraminga).]

Many people ask what is the good of the Agricultural Bureau, and they little realise that most of the improvements in the present-day methods of farming are due to the Department of Agriculture and its interchange of ideas amongst the different Branches of the Bureau. If any information is required by any member of the Bureau on any matters concerning farming, including veterinary advice, they have only to write down to the Department of Agriculture personally or through the local Branch and it is promptly replied to. The Bureau helps farmers to co-operate and discuss the different styles of farming. Co-operation is the most essential thing for the farmer, and it is a pity they would not co-operate in many other ways besides the Bureau, and the farmers would be a bigger force to reckon with in this country.

Take, for instance, the requests to the Government every year at the annual Congress. How many of these are granted?

If all the farmers were one big co-operative body those requests would have to be granted or much more consideration given to them. The Agricultural Bureau is a big step towards that end, and if every farmer joined the Bureau and acted as a live member co-operation amongst farmers would be a long way towards achievement. The Bureau also helps to bring the farmers together socially and shows a farmer that his ideas and methods are not always the best. There is no doubt about it that most farmers think their methods are the best, and at the Bureau meetings they have a chance to discuss these things and learn of another member's methods, which are sometimes much better. Also it helps a farmer a great deal to be able to talk about his troubles and find that after all he is not carrying the whole world on his shoulders as he thinks. The debates help members to do a bit of public speaking, for there is no doubt a lot of farmers are self-conscious when it comes to getting up to make a speech, whereas talking at Bureau meetings gradually brings them out and teaches them to forget that. The privilege of membership also carries responsibility with it, and every member should do his utmost to make the meetings interesting. One way of doing so is, if any trouble is met with in the farm work, make a note of it and bring it up at the next meeting. Regular attendance is essential to keep the Bureau active and alive, and every member should strive to attend as regularly as possible. The *Agricultural Journal* is very useful, and some very handy hints can be picked up from it. The Department of Agriculture also provides free fares for two members every year to attend the Annual Congress, which should be very much appreciated and taken advantage of.

Modernising the Farm Homestead.

[L. A. Myers (Mount Hope).]

Is there anything more pleasing to the eye than to go to a neighbour's farm and see a fine homestead and surroundings? There are many ways in which our old homesteads can be made to look quite up-to-date with the aid of a little money and plenty of brain power. Many small things make a place look dilapidated and untidy, and the first is fencing. The use of ti-tree posts around a homestead is absolutely a waste of labour and money, as they do not last very long and after about two years they look more or less untidy. Good posts may be got from the railways for about 1s. each, and besides having something that will last one has a post that when it has been up a few years will look just as good as the day it was put there. If we have not the necessary cash to purchase them from the railways, another way of getting good posts is to get gum. If we look in the right place they can be got for practically nothing at all. Good wire should also be used to make a tidy appearance, and with big posts a fairly heavy wire should be used, or if rabbits are anywhere near the homestead netting would be preferable, with a plain wire and barb on top.

Sheds are another item which can make the homestead look very untidy indeed. With a little care an old shed can be made to look quite neat. We all look forward to the day when we can build iron or stone sheds, but where a man is struggling for a living on a new farm this cannot be done immediately. Here, again, the gum or other good natural timber comes into use to build brush sheds, which, although not as good as the iron or stone, serve the purpose for the time being, and if kept in proper repair do not look untidy.

All sheds, stables, and horse yards should be built at the back of the house if possible, and at least 100yds. to 200yds. from the homestead. Nobody wishes to hear horses tramping around all night when they are trying to sleep. In selecting a site for a homestead one of the first things to try for is water. Very often this is impossible, but in many places there is an abundance of water which is not put to its proper use. Besides having stock water at the homestead, which is a great asset, we all realise the value of a garden, which saves expense in the house and gives it a fresh, clean appearance.

Our farms in many cases are far too haphazard. I wonder how many times any one of us has gone into the blacksmith shop to do a five-minute job and looked for the tool to do it with for half an hour. One of the biggest "eyesores" is a fine homestead with old dilapidated sheds and untidy surroundings. The least a man can do is have a tidy and comfortable homestead and sheds which make it a pleasure to work the holding and also increase the value of the place. Many other things could be mentioned, such as trees and hedges.

Breeding and Feeding for the Autumn Egg.

[S. Eyles (Clarendon).]

(This paper applies to the hills or cool districts.)

A few years ago the top price for eggs used to be reached in June and July. Now the highest price for some years is reached in May. The price of eggs used to be very low from the end of December to the end of April. Now, owing to the popularity of cool storing eggs, the return for eggs is much better than it was. Even if the chilled egg does depress the market for the winter egg, the poultryman is better off, especially now that the merchants have an Equalisation Committee.

Breeding for Autumn Eggs.

Some strains of fowls are noted for their early laying and late moulting, because they have been selected for years as late moulters and consistent layers. One cannot expect autumn and winter eggs except from good stock, although one can improve the present stock by intelligent management and get more eggs than usual. The best way to start is to pick out breeders from the hens that moult late. Some hens start to moult in January and hang around and will not lay again until July or August. These hens are best sold off. The best time for hens to moult is from the end of April. These hens usually come in to lay again in July and are in full lay in early August.

When picking out breeders handle them for capacity (depth of body) and production (width and shape of pelvic bones). Do not breed from a coarse, beefy bird; study the head, selecting a bold eye, good red faces, and a young looking face. When the hens for breeding have been picked out place rings on their legs, and as they are coming out of the moult put them in the breeding pens and they will settle down and there will be no break in the laying once they start, and they are ready to be mated.

If one has no special strain, purchase cockerels from a stud breeder, who will state what they are bred from. This alone will improve the laying capacity of the future young stock. Buy nothing that is reared from a hen of less than 240 eggs. Once a start has been made one can mate up a single hen to rear one's own cockerels. Make sure that she is a good hen. Put her in a small pen by herself. Every other evening put the cockerel in with her. In the morning, after feeding up, the cockerel may be placed back with his pen of hens. Mark the eggs from this special hen, and if possible put them under a broody hen. If an incubator must be used, place the marked eggs in a small frame with wire at top and bottom. When removing chicks from the incubator toe-punch them and save cockerels for future breeding operations. All this will take time, but will repay the trouble.

Time to Hatch.

Start to hatch heavy breeds in July as early as possible. Do not hatch the heavy breeds later than the end of August. Light breeds are best hatched out in late August and not later than the end of September. If light breeds are hatched too early in the hills districts the pullets usually manage to go into a neck moult just when eggs are about the top price, and go off the lay for about six weeks.

Hatching Too Late.—The first hatch is usually the best; from the second and any subsequent hatch the pullets are much more backward, do not develop so well, and start to lay when about 8 months old, whereas the earlier hatches start at about 5½ to 6 months. Try to get light breed pullets laying at about the middle of February and heavies at about the middle of March. One should then have a large proportion of first-grade eggs by about the middle of May.

Feeding for Eggs.

It does not matter how good the stock is; if not fed right one will not get eggs when they are wanted most. Start to feed properly right from the incubator. Some people think that the chicks need only bran and wheat. The chicks will grow and perhaps do well for a time. The point is to breed and feed for stamina. Continuous egg laying is a big strain on the system of any fowl; there are quite a lot of minerals in an egg, and those minerals are all manufactured by the hen. If you do not feed right the hen robs her body of the minerals until she has no more, so one must feed to build up the hen's system and to start and keep feeding to replace the minerals as they are used in egg production. I am a believer in cod liver oil in the concentrates used in the mash; also about 1 per cent. each of fine shell grit, bone meal, fine charcoal, and plenty of green feed at all times. Allow 1oz. per bird each day; of course, less for chicks. Do not overfeed; if the pullets do not clean up their food at once, feed lighter next feed. Always have shell grit and sharp, hard grit in front of them. Feed generously all the time, even when they are in moult, also do not feed forcing foods. One may get more eggs for a time, but almost surely the best layers will be lost.

Housing.

One will not get autumn and winter eggs unless the birds are housed in warm, dry sheds free from draughts. Open range is good for growing stock, but not for layers. They use up too much energy chasing around. Pen up pullets as soon as their combs begin to get red. Do not give them laying mash until they have been laying at least a month. Feed a growing mash from about 2 months old. Provide plenty of nest boxes, one to each six layers. Use shell grit in nest boxes, not straw or similar material, as that is a harbour for vermin. Provide a corner with fine sand, ashes, or dry earth for a dust bath. This will help to keep them free of vermin. Visit the birds at night, and if they are busy picking themselves or are very restless have a good look around the perches and destroy any vermin there. Paint the perches with crude oil, or a mixture of sump oil and kerosene. External and internal vermin will rob one of a lot of eggs.

When feeding up note that all birds come up for their food. If any do not, catch them and put them in a small pen by themselves; they are not normal. If they respond to simple treatment, place a ring on the leg and put them back in the pen. Do not breed from them. If you have any hens that lay right into the moult they are good hens, but their eggs may not be hatchable unless they have a rest. Force them off the lay and place them in a pen and starve them of food and water for a day, feeding wheat and green feed only for a few days until they stop laying. Do not breed from pullets even if they are laying large eggs. Nothing is known about the livability of the bird, whether it is a broody or anything else that is not desirable. Broodies should have a leg ring and should not be bred from. Personally, for some years my main breeding stock is 4 and 5 years old. I have improved the livability of my flock considerably. Remove the young cockerels from the pullets as soon as they can be picked out. Keep the different hatches separate, at least until they are ready to lay. If anxious to get the best out of fowls work to a timetable and feed regularly. If there is any need to break the time, feed earlier rather than late. After all, successful poultry farming is the same as any other business or branch of farming—good management, attention to details, observation, and regularity.

Hay Growing in the Clarendon District.

[E. A. Harper (Clarendon).]

Preparation of the Land.

In order to ensure a good crop it is necessary to fallow, and this operation should be done as early as possible after seeding. The ground should be ploughed to a depth of from 3in. to 4in. and then left for a time to enable the air to penetrate in order to sweeten the land. After this has been done, the harrows should be used in order to break any lumps and level the ground ready for the cultivator. Harrowing also helps to germinate weeds. Cultivating should be started in early spring, when the weeds are in evidence. This job might be said to be the most important in the preparation of land, and too much time cannot be spent on it. In addition to killing weeds, it puts the land into such a condition as to hold the moisture, on which the success of the future crop depends.

SELECTION OF SEED.

We must consider the variety of wheat most suitable for hay. One knows what the old Tuscan was like for hay, but that is gone but not forgotten. Growers had to find another wheat to fill its place, hence Wardens and Corrals came in for a trial and turned out really good. Sword is the next best, also Leak's rustproof is another good wheat. To ensure a good return a rotation of crops, such as fallow, wheat, peas, wheat, or oats, should be followed. Pea ground should not be ploughed if there is not much rubbish, but should be cultivated. Having worked the ground to a good seed bed, drilling should commence about the beginning of May, with 2bush. of wheat and 1cwt. super per acre on fallow and 1½cwt. super on pea ground.

HAY CUTTING.

Start the binder when the grain is about half to three-quarters grown. Then we get a good green straw as well as a fair-sized grain and hay that will weigh well.

STOOKING.

If hay is stooked well there is not much danger of rain getting in and damaging it. Stooks should not be too big; it will be able to dry out more quickly. If stooks are too small they will fall over, and one might just as well not stook. Leave hay lying on the ground after the binder in good weather half to a full day before stooking, but if the hay is well advanced stook at once. Carting should start as soon as possible. We cannot do it when ready because so many of us have more than hay to look after, so we must get it stacked as soon as possible.

Seeding in the Brimpton Lake District.

[P. H. WAGNER (Brimpton Lake).]

In the first place the fallows should be worked with the first rains, making sure that all weeds are killed before seeding commences; it is impossible to get the best results if weeds are allowed to choke the crop.

Grassland should be ploughed with the early rains, and by working well before seeding this land can be made to grow a crop equal to fallow, especially where clover is plentiful. This is where the cultipacker can be put to good use, as it breaks the clods and gives a better germination of weeds.

Stubble lands for barley should also be worked up with a cultivator or combine well before seeding time.

I do not mention land for oats. Where one depends on horses for working the farm it pays best to sow the oats on fallow. It is a much cheaper way of getting a sure supply of hay. It is cheaper to go over 70 acres of fallow with a binder than to cut 140 acres on stubble land. Oats for hay should be sown first, about the middle of May. Algerian stand the excessive wet, and also stand better than the earlier varieties. About 50lbs. of seed and 120lbs. of superphosphate should be sown.

The best time for sowing wheat in this district is from 10th of June to the end of June, and I have had good results up to the middle of July. From 60lbs. to 70lbs. of graded and dry-pickled seed with a dressing of 150lbs. of super per acre and the

Ken Ekers with his winning entry in the Mount Compass Schoolboys' Potato Competition.

earlier varieties of wheat, such as Ford, Nabawa, Late Gluyas, Dan, and Sword appear most suitable for the district.

Malting barley should be sown as soon as the wheat is finished. Malting barley is the best type as it is a surer setter than the Cape; 60lbs. graded and dry-pickled seed with 90lbs. of super should be sown. Good crops have been grown with 60lbs. of super.

This paper has been written entirely for old land, but as we have a good deal of new land in the district I will endeavour to give my views on the seeding of new land.

New land should always be fallowed, and about March this fallow should be disced back either wet or dry, the remainder of the shoots cut off, and then scrub-raked. This will allow a cultivator or combine to be worked, which should assist in levelling the ground. New land can be sown at any time in May with a mid-season wheat, such as Currawa, Nabawa, or Ford. These wheats all grow a good straw for fire raking, and my reason for mentioning mid-season wheats is that they stool better.

New land should not be sown too thickly, as the wheat will stool according to whatever the land is capable of. The suggested rate of seeding is 45lbs. graded, dry-pickled wheat with 90lbs. of super per acre. This crop should be followed by oats. I do not believe in trying to grow a second crop of wheat on new land. The rotation could then be fallow, oats, fallow, wheat, oats, and then a spell with top-dressing and grazing. All land both new and old should be free from loose stumps and stones, and the harrows cannot be used too frequently.

Sheep Raising and Management.

[J. Fradd (Beetaloo Valley).]

In dealing with this subject one has first to decide what type of sheep is suitable to one's district. In this district my preference is for the Merino, a breed which produces a fleece of clean, good quality wool, which at the most will be only slightly dusty, but will be reasonably burry if run on cultivated land. With sheep as with all other animals, it is essential to keep the best procurable within one's means. A beginning can be made by procuring a good line of station ewes. Such ewes should be large-framed, plain-bodied, and should carry a good, useful wool on the strong side of medium. By careful culling of ewes not conforming to the type one has in mind a fair start should be made. Shearing is a good time to do the culling, classing out any of poor type such as undersized, bad doers, faulty mouths—undershot or overshot—cow-hocked, slab-sided, weak constitutioned, short dense wrinkly-woolled ewes, etc. Next, good class rams should be procured from someone who specialises in ram breeding and who has a reputation to live up to. Such rams should have all the good points in breeding mentioned earlier in the ewes, and if possible excelling in any weakness that the ewes may possess. Keep in mind always the type of sheep you desire, go for it, and do not be misled by the ever-changing fancies of the wool buyer, who will probably pay good prices for the strong. robust wool one year but who may swing to the finer types next year. By breeding a good, shafty 60-64 quality of good length you will not go far wrong. The very strong wool has a tendency to become rough and harsh handling, while the very fine is associated with the small light-cutting type of sheep, which apart from returning light clips do not command the same value when sold as fats or stores.

At least two rams to every 100 ewes should be used when mating. The aim should be to have the lambs dropped at a time when there is a supply of greenfeed available for the lambs. About five calendar months will elapse between mating and the commencement of lambing, the rams being left in for at least six weeks; this allows each ewe two opportunities of being served, the period between seasons being about 21 days.

Breeding and feeding go hand in hand, and it is essential at all times to have sufficient feed to keep the flock in a thriving condition. Especially does this apply to the ewe rearing her lamb, and if sufficient feed is not available in the paddock hand-feeding must be practised. Do not wait until sheep are in low condition before starting; it is far better to begin while they are in good order. All supplementary feed, excepting nuts and meal, can be produced on the farm, such as hay, oats, barley, peas, and, best of all, ensilage.

Flies are the worst enemy of sheep in this district; worms and footrot are seldom met with. By keeping the sheep well crutched, keeping a few inches above the tail and keeping the flock in a healthy thriving condition the fly menace should not do much damage. Jetting is another good way of dealing with the fly if done thoroughly. Burn or bury all dead carcases of animals if possible; they only become a breeding ground for flies if left lying about. We probably have rabbit poisoning to thank for the large increase in flies, for in addition to providing the fly with unlimited breeding grounds large numbers of insectivorous birds were wiped out thus upsetting the balance of nature, as birds are the natural enemies of flies. Salt should be fed in troughs during the summer months; super can also be mixed with it if desired. Classing the wool clip is possible for almost anyone to accomplish, provided care and common sense are practised. It is really a matter of keeping the various types of wool in their respective grades, keeping the short, fatty, heavy conditioned, tender, or broken fleeces from the top lines, which should consist of the lightest, brightest, and most attractive wool of fair average staple. If in doubt of a fleece it is better to put it in the lower grades than to chance it in the top line, but be sure and keep a good, even length in your top line.

A good sheep costs no more to keep than a bad one, and will be a greater source of revenue and satisfaction to its owner. Remember it is far better to under stock than to over stock, as over stocking gives neither the sheep nor the owner a chance to get anywhere worth while.

Fences.

[A. Lutz (South Kilkerran).]

Fences can be divided into various types, namely, the three-wired wooden-post fence, the five or six-wired fence with either wooden or railway iron posts and droppers, the fence made with reinforced concrete posts and droppers; also the various types of ornamental fences used in front of houses.

The three-wired fence is used where there are no sheep and where cows are mostly kept. The posts are spaced from 10ft. to 12ft. apart with the strainers at 5ch. or 10ch., depending on the nature of the country. The wires can be either three barb or two barb and one plain wire. These can be spaced 12in. apart, leaving a space of 9in. from the top of post to the first wire and a similar space from the bottom wire to the ground. The wires may be tied to the post or they may be stapled. This fence will keep out the majority of cows, although some will manage to crawl through.

The five or six-wired fence can be made with either wood, railway iron, or reinforced concrete posts. The posts may be spaced at anything between 30ft. and 60ft., with iron droppers at every 10ft. The wires used are two-barb and either three or four plain wires, the plain wires being taken through the holes in the droppers and tied to the posts. These fences are used where mainly sheep are kept.

The cyclone fence is used a great deal on the big sheep stations, where there is not much need for fence repairs. The fence can be erected very easily, having a strainer at every 10ch. or 15ch. with droppers driven into the ground at equal distances apart. This type of fence is useful where only a portion of a paddock is needed for feed.

The fence made with reinforced concrete is the ordinary five or six wired fence. The concrete posts are made in a special mould having a taper of 2in. from top to base. The usual size of these posts is 4in. at the top and 6in. at the base, the posts having holes to carry the wires. The posts may be spaced between 30ft. to 60ft., as the case may be. The droppers can be spaced at 10ft. apart, with one at every post. These are tied on to the posts with any soft galvanized wire.

Having dealt with the various types of farm fences, I will explain the various ornamental fences. These can be divided into various styles, *i.e.*, Cyclone, post and chain, and the stone wall.

The Cyclone Fence.—This fence can be made with various styles of Cyclone wire, a very popular type being the chain mesh. The posts for this fence can be spaced about 6ft. apart, having either a pipe or rail at the top and a rail at the bottom.

The wire can either be tied to the rail or stapled. The bottom of it is let into the ground about 2in. or 3in.

The Post and Chain Fence.—By this I do not mean just an ordinary fence made with cement posts and chain, but a fence made or built up with cement concrete, and posts spaced about 6ft. or 8ft. apart, having a hole in about 2in. from the top for the chain. The chain need only be very light, as it does not have to take any weight.

The Stone Fence.—This fence is made with any light or dark coloured stone, whichever the people prefer. The stones can be cut to fit, or they could just be made to fit where they will.

Fencing.

[K. K. Skeer (Millicent).]

With improved pastures and heavy carrying of live stock, subdivision of paddocks is essential, and fencing must be given increased consideration in the future. When a landholder intends erecting a fence he should be sure to secure the best strainers and struts procurable, as the life of a fence mainly depends upon these two. When strutting, place same about 2ft. from the top of the strainer, with a good flat stone at the other end. If struts are placed too high in soft ground it has a tendency to lift the strainer up. In selecting struts, be sure to have something that will last. About 7ft. to 8ft. is the length required. Many a good fence is ruined because of inferior strutting. Struts that have been in use for a few years and have rotted or broken allow the strainer, and eventually the whole fence, to give way. Strainers for ends or corners should be round, 12in. to 14in. in diameter, 7ft. long, and for running strainers I prefer a post 10in. x 12in. split, and 6ft. 6in. long. A round post can be improved by tacking a piece of tin over the top to keep water out. An ordinary post 6in. x 5in. and 5ft. 6in. long is a good serviceable post. Split droppers are better, as they are stronger and can be let into the ground, making the fence more solid. The lengths given above are for a fence 3ft. 4in. high, which is a good all-round fence. If fences are erected too high big stock have more leverage on them than on lower fences, and stock that will jump over 3ft. 4in. are not worth keeping. Outside fences are improved with two barbs, always using heavy gauge barb, as light barb will stretch and break, and is a source of annoyance, without saying anything about the time taken in repairing it. High tensile 12½ gauge plain wire is a cheap wire to use, and another advantage is that it keeps tight when strained, as there is no "give" in it. Some people tell me it will snap in frosty weather, but I have not had that experience with the wire I have used. Strainer posts should be sunk 3ft. 6in. for corner or end strainers; ordinary posts 20in. to 24in. If possible, all posts should be rammed right from the bottom. It is impossible to get posts firm by filling the hole before commencing to ram. Line posts, 18ft. to 20ft. apart, with two split droppers in between, make a very fair fence. A suitable gauge for a six-wire fence is as follows:—From the ground 5in. 6-6-6-8 and 8in. apart. Fences could be improved by the use of good serviceable gates. Wood and iron gates are expensive to buy where so many are required, but an inexpensive gate can be made of wire with several wooden droppers placed fairly close together to prevent the wire becoming tangled, and covering it with netting. A loop of wire placed at the bottom of the post will hold the upright, and a wooden lever for the top will enable the gate to be pulled up firmly. Good fences save chasing stock that have broken out. Bad fences induce young stock to become crawlers, and once the habit is cultivated, even a good fence will not hold them. The main points in fencing are good posts, good strainers, and struts, well-spaced wire, well strained, with barb wires securely tied to posts, and all posts well rammed. Last, but not least, it is well to remember that a bad fence is often responsible for a bad neighbour, and a good fence a good neighbour.

Rabbit Destruction.

[T. F. Gratwick (Kongorong).]

There is not a man, or boy, who does not know all that is necessary about rabbit destruction and who does not know the benefits that every landholder derives from a complete extermination of the pest, and also that the man who habitually feeds a mob of rabbits carries on in a hand to mouth fashion, until the bank or a stock agent suggests that he had better let someelse try it.

When I was a youth rabbits were a new thing, we knew very little about them, and most people employed poison as a means of discouraging the pest. I have seen rabbits suffer very heavy casualties from both phosphorus and strychnine, but that was mostly after they had eaten everything edible in sight and were scratching for the roots. Then a few of the more progressive land holders decided there was only one way of getting rid of rabbits, that was by wire netting and hard work; that is largely the foundation of rabbit extermination to-day.

In those days it was said that closer settlement was the cure for the rabbit pest. To-day it generally follows that the larger the holding the fewer the rabbits and it is safe to say that there are more rabbits on many blocks in Kongorong than there are on Coola and Mount Schank stations, and we employ a couple of vermin inspectors to see that rabbits are cleaned up, with mostly very unsatisfactory results.

It is no great credit to the small landholder. No landholder ever made a profit out of feeding rabbits. Some trappers may make a living, but skin buyers and middlemen make the only real profit there is in the rabbit.

With rabbit destruction in the district a certain amount of vermin-proof fencing is necessary. The cheapest type of fence and at the same time fairly satisfactory is made with good posts erected 10yds. apart, with 3 droppers between, 36in., 17 gauge, 1¼in. mesh A grade netting put 3in. in the ground, one No. 8 galvanised wire, 2ft. 9in. from the ground, one 12½ gauge high tensile wire 2ft. 11in. or 3ft. from ground, and 12 gauge barb on top of fence, which will be 3ft. 6in. high, or if on sheep country 3ft. 4in. is high enough.

The usual body wire can be dispensed with, and is an advantage in fern country, as posts do not burn so freely without the augur hole in the middle; also if the body wire should prove to be of poor quality it helps to rust the netting, and if animals are going to knock the fence about the body wire is very little protection.

While admitting that 42in. netting is better than 36in., I would always put up 36in. A grade in preference to 42in. B grade. As for the actual destruction of rabbits if traps are used they should be left in the burrows several days before shifting. Fumigation is outstanding for killing rabbits, and if a man's time is of some value it is also the cheapest. There are many ways of cleaning up rabbits but perseverence is the main item in all of them. Dogs are indispensable, and it is best to have a pretty good one, and not rely entirely on sheep dogs. The most important part of the job is the finish. When you are down to the last half dozen do not think that is good enough, but get the last one. With dogs and a fumigator it is not so hard as many people think.

Exterminating Vermin.

[H. L. Ramsey (Miltalie).]

It seems as though the destruction of vermin is being slightly neglected by some of our farmers in this district and that vermin, especially rabbits, are taking control of some established farms. But outback farmers are facing a far bigger problem, for their country at the present time seems to be becoming over-run with kangaroos. Foxes at certain periods of the year are very troublesome to the sheep breeder, especially at lambing time.

Rabbits.

This pest is probably the easiest of the vermin to destroy, and if rabbits are treated in the proper way and at the proper time, they are only half the battle. Baiting and trapping will never totally destroy them, but of course it keeps them under control. The best and safest way to destroy rabbits is by destroying their burrows. This can be done with the aid of a plough and is quite an easy way too. If all burrows were destroyed in early March before rabbits start breeding it would not be long before they would be well under control; of course providing everybody did it at the same time, and, it should be made compulsory.

The ideal time to trap is after the burrows have been ploughed. If traps are set the stray ones will be caught.

The fox is much harder to catch, although scores of them are caught by baiting and also spotlighting.

KANGAROOS.

The most destructive and hardest of all vermin to catch is the kangaroo. This pest seems to be taking control of our out-back areas, and the farmers who are going out there to grow wheat have a problem to face. At the present time the kangaroo seems to be spreading at a fast rate, and it is quite time that somebody woke up to the fact and that something was done to try and check them. Although they are being caught by the score there still seem to be hundreds left. This pest would be hunted and killed at a faster rate by our keen sportsmen who indulge in this kind of sport, if it were not for the expense. A bonus should be paid on every kangaroo scalp that is caught. The man who catches these pests on his own property is not only doing himself a good turn but is also helping his neighbours. Why should not his neighbour help to pay the expense connected with the hunting of this vermin? Spotlighting kangaroos is a good sport but expensive.

If the Government will find ammunition for our sportsmen on the rifle ranges why should they not help in some way to find ammunition for the sportsmen who go hunting this pest?

Fences on the Farm.

[E. A. SPRIGGS (Yadnarie).]

Good fences are essential on a mixed farm and should be kept in repair and not neglected as is often the case. A few weeks every year should be used for repairing them and it will be a saving of time in the long run.

The best fencing of all is the weldmesh fence and when properly erected it is permanent. With weldmesh posts are only required about every 8yds., or if for sheep alone, 10yds. To make a good fence of this type leave posts 43in. above the ground and have the tops of posts cut as straight across as possible so that the barb wire will not slip off. The weldmesh should be fastened so that it is 6in. from the top of posts; many a good fence is spoilt through leaving too wide a gap between the top and second wire. After straining the weldmesh up as tightly as possible and after it has been tied to the top hole bored in the post, bore another hole at the bottom and tie down firmly. To complete a really good fence it is advisable to strain another barb between the bottom of the weldmesh and the ground which will be 5in. from the bottom of the weldmesh and 5in. from the ground. This completes a fence that is 43in. high and impossible for stock to get through. As it is higher than most fences seen on a farm in this district, stock will rarely attempt to get over it; in fact it is almost man-proof.

If a cheaper type of fence is favoured the 6 wire fence is the most satisfactory, but it will be necessary to erect more posts than in the case of the Cyclone or weldmesh fence. The best method of erecting a 6-wire fence is to have the posts 40in. high and put the first wire 9in. from the ground in drifty country, and then space the next four wires 6in. apart, leaving a 7in. space between the two top wires. Five plains with one barb placed on top of the posts makes a fairly serviceable fence, but if sheep are inclined to get through a fence, they can get through a fence of this type.

Tractor v. Horses.

[L. BURTON (Ramco).]

During the last two or three years there has been here a considerable change-over from horses to mechanical power. The tractor is becoming more and more popular every year, due to the more economical running and improved mechanical construction compared with ten years ago. With a tractor a farmer can do his work a lot more quickly and at the right time and therefore has more time to spend attending to other work such as sheep, fences, etc., which would probably be otherwise neglected.

Now let us compare working costs and speed. With a kerosene tractor equal to 10 horses the cost to sow 100 acres works out at about £2 10s. The costs of feeding a 10-horse team with chaff at £3 a ton (a horse eating 40lbs. per day) and taking a week to do 100 acres, works out at £3 15s. This shows £1 5s. in favour of the tractor. As stated above, horses take about 6 days to do 100 acres and a tractor could do it in 3 days of 8 hours each. A tractor can be worked the whole 24 hours per day. Thus if a man wanted to sow 500 acres with a tractor he could wait for rain and then sow the whole in a week, whereas with horses it would take 5 weeks. Every year with horses 50 acres or so have to be cut for hay, which otherwise could be left and stripped If it yielded a 6 bushel crop it would go a long way to pay for tractor expenses. Then again a man could run another 50 sheep if horses were dispensed with. Some repairs have to be done to the tractor, but there are also repairs needed to the horse harness, stables, yards, mangers, and fences.

Most of these facts put forward speak in favour of the tractor, but one major point against them is the rather high capital cost, especially in this and other districts of unreliable rainfall. The burden of purchasing a tractor is more than most of these farms could carry at the present price of wheat. But in sure rainfall districts a tractor is a great asset and would soon pay for itself. It looks as if tractors have come to stay and this is indicated by the sale of some of the State's largest stud stock.

The Horse on the Farm.

[G. HENDERSON (Nantawarra).]

On a large proportion of farms the horse is the most neglected unit. He does not get half the care and attention that he is entitled to. It does not matter what the team is like so long as the animals are evenly matched. Do not keep a horse that is slow and a "pointer"; he is only an annoyance to the driver and the rest of the team.

Feeding.—This is the part of horse management which is most neglected. On numbers of farms there can be seen a yard with feeders around it; on others a shed with a manger in it. Then ten, fifteen or more horses are turned loose into it, with the result that the "boss' takes up enough room for three or four horses, and the timid horse stands back and perhaps gets his feed after the others have finished. It is much better to tie each horse. Then the teamster knows just how much each horse is getting, and if one horse has not eaten his breakfast it is very noticeable and can be treated accordingly; while with the loose feeding method it is quite easy for a horse not to have eaten his feed and be overlooked. He is taken out to the paddock and later found to be unfit for work, resulting in much loss of time. The proper way to keep horses is to have a stable—a straw one will do, with a stall for each horse; and tie up each horse. There should be a peg in the post alongside each horse's head to take collars, hames and winkers. There are two wrong ways of feeding horses—underfeeding, and tipping in too much at a time. I recommend feeding four times a day, and then giving each horse as much as he will clean up and no more, with supper the heaviest feed. After feeding a team for three or four days, one can judge fairly accurately. There is no need to mention what happens to the team that is underfed. The man who tips in too much feed will not get the best results from his horses or feed. At the next feeding time to go the feeder and pick up a handful of feed which was left over and smell it: It is tainted and sour after the breathing and nosing about by the horses. I am a firm believer in feeding plenty of oats; in fact horses cannot be given too many oats, provided it is worked up to them gradually and they are working heavily. When working, feed on good hay-chaff eaten for preference—with three horses to a kerosene tin of crushed oats. Sometimes give more or less according to the work; that is, for breakfast and tea, no oats for the night feed. When feeding nosebags in the paddock for dinner, give mostly oats, and between six or seven double handfuls to each horse. They do not take long to eat it, and the horses are better for it, as they are not overfed.

Grooming and Clipping.—Besides making the horse look better, there is no better time than when grooming in the morning to find out if the horse has any tender spots on the shoulders, for by paying attention to the grooming it will be noticed that he eases away from the brush if there is any soreness. Whilst speaking of grooming, one cannot pass over the importance of clipping horses in the autumn. When I first came to this district I was amazed to notice that no one clipped their horses, and when I did clip mine it was predicted that they would die, but such was not the case. In clipping the horse take off all the hair on the belly, trace high, up round the shoulders, and in between all four legs. It will be realised how much cooler and freer a horse must be to work with all that hair off. He sweats very little and dries very quickly at night, and is not the wet-coated and miserable looking object that one sees in the mornings towards the end of sowing time. Another point in favour of clipping is that there is not so much hair on the shoulders to become matted; hence there is less chance of sore shoulders.

Harnessing and Sore Shoulders.—The collars should be close-fitting, not too wide, nor too long. It is preferable to run the risk of choking a horse down now and again than to have the collar too big. Big collars are the cause of many sore shoulders. The hames should be fitted well up to the collar, with the draft hook fairly high up from the point of the shoulders, for it is on the points of the shoulders that most sores occur. It is a very common fault to see the points of hames hanging down two, three and even four inches from the collar. That is another source of sore shoulders. The hames should fit snugly around the collar and should be strapped tight. Sore shoulders are chiefly caused by carelessness, lack of humanity, and bad management. If a horse has a little lump on the shoullder in the morning, examine the collar for the cause. If it is rough, use a hammer or bottle on it. If the cause cannot be traced, cut a hole in a sugar bag to fit over the tender spot, and it will probably not go any further. Do not leave it and think it will be all right in a couple of days. Instead, there will be a raw spot. Other methods are to change the collar or alter the position of the draft hook on the hames. A change of hames sometimes has the desired effect. Too many oats do not cause sore shoulders. More sores are caused from the lack of oats.

Working.—When starting a team after a week or two's spell, work the horses an hour or two each day for the first few days, so that their shoulders will not scald. If they are inclined to be free, endeavour to restrain them a little. It is always advisable to load light on farm work. Put in an extra horse or two so that they can walk along, instead of making heavy work of it. It will be found to be cheaper at the end of the year. I always work the team tandem, using pulley chains. This method keeps the horses straight ahead of the implement, which makes a marked difference with harvesting machinery.

If a team is fed and handled on the lines suggested, with a good man in charge, the owner will have something to be proud of, and what is more, will not be far behind the tractor man at the end of five years on a farm.

The Grade Cow.

[E. W. Yeates (Hartley).]

At the present time, with butterfat prices at a high level, cows are a good paying proposition if they are managed correctly.

The value of any cow depends on her production of butterfat. The only sure way of telling this is by testing each individual cow monthly. The standard for a mature cow is 350lbs. for a lactation period, but this is too high for cows in this district, where feed is scarce, especially in summer. A cow that reaches 250lbs. is well worth her place. Those that do not come near this mark should be sold, preferably to the butcher.

The constitution of a cow is of importance. She must be a "good doer"; that is, able to stand severe changes in the weather, able to digest her food well, and so be anxious for her feed. Crossbreds generally seem more robust than purebreds. Jerseys especially cannot stand cold weather. This is one reason to prefer a first cross, preferably a Jersey with some bigger breed, either Shorthorn or Friesian. In New Zealand, one of the big milk producing countries, there are 80 per cent. grade cows, and nearly all of these are grade Jerseys.

Thirdly, the appearance of a cow, although not economically important, is relative tc both production and constitution. A cow in a show ring is judged on appearance alone. There are numerous points which a judge looks for, but the following are the more important ones:— Her mouth must be large, with good, sound teeth for good chewing of her food; nostrils wide open for easy breathing; eyes bright and clear (this is a sign of good general health); skin and coat soft and smooth; back straight; belly deep, showing a capacity for food; ribs well sprung, giving room for internal organs. The udder must be large, not hung too low, but extending up the back and well forward. Teats must be even and well spaced, with pliable skin. The milk wells and milk veins are considered by some to be an indication of a cow's production; they should be large, for they are the suppliers of milk and blood to the udder. A farm cow must be docile. A cow that is nervous or wild does not do herself justice at milking time, for she only produces milk when she is quiet. A farmer also cannot waste his time with a vicious cow; he has too much else to do.

A cow that fulfils the above points needs only two more vital things, *i.e.*, food and water. Fodder is a subject in itself. Suffice it to say that a cow needs a tremendous amount of green feed, which is the best natural food, especially for milking cows. Where this is not always available concentrates must be fed, crushed oats, bran and linseed meal being the best. A cow must have plenty of water for health and production of milk. It has been proved conclusively that the amount of milk a cow makes is related to the amount of water she drinks. If she goes short of water her milk supply immediately falls. It is interesting to note that a cow drinks more at night than in the day, so all farmers would do well to see that the cows have access to water at night time.

Activities of Women's Branches

RENDELSHAM.

The Branch held a very successful Cooking Competition on 4th May. Seven new members were enrolled. On 11th May all officers were re-elected for the ensuing year. (Secretary, Mrs. Z. Bignell.)

STRATHALBYN.

An address was given by Mrs. E. McBain at the March meeting, and on 14th April, Mr. H. J. Apps (Senior Dairy Adviser) addressed a meeting of 19 members and three visitors on "Butter Making." On 12th May a debate was held on the subject "City *versus* Country Life." Mesdames Collett, K. Westley, Rowlands, and Miss Eckert spoke in favour of city life and Mesdames Rankine, Langsford, Sykes, and Bowden supported country life. The judge's decision was in favour of the team led by Mrs. Collett. (Secretary, Mrs. C. Hudd.)

TANTANOOLA.

Nine members were present at the March meeting. Mrs. E. Telfer read a paper giving hints on the growing of the crop and recipes for sauces, &c. On 6th April Miss J. Telfer gave a demonstration of making a work basket. A competition was arranged by the Secretary, Mrs. Stafford, for the May meeting.

WARRAMBOO.

"Poultry Keeping" was the subject of a paper read by Mrs. Steer at the February meeting.

Gardening.

The following paper was read by Mrs. Daniels, who also distributed seeds and cuttings to members. Every garden should contain a few hardy shrubs. They do not need much attention and always look nice. The Tecomas are very hardy and showy. The Aloysius or Lemon-scented Verbena is a great favourite, as it is dainty and light for putting with cut flowers. If the flowers are cut frequently they will bloom all through summer. The leaves are very useful, too. When dried they can be used the same as Lavender. Rosemary is another old-fashioned shrub, and makes a beautiful miniature hedge if cut frequently. Everyone should have a few good roses. The Dorothy Perkins, which has huge clusters of pale pink flowers, is one of the hardiest, and will soon cover quite a big space. For a scented rose the Daily Mail (dark red) is hard to beat. Carnations are very hardy, and if perpetual flowering types are grown there will always be a few flowers to cut. March is the best time to strike them, and if a cutting is put in the garden where it is to grow and covered with a jam jar it will nearly always strike without any trouble if kept damp. The jar can be left over the plant until it has filled the jar. Cuttings from spring flowering varieties are harder to strike than the Margaret Carnations, as the wood is much harder. If manure is used in the carnation bed, it must be well decayed, and lime is a splendid dressing for them.

The Perennial Statice is very dainty and exceptionally easy to grow, as it sends out suckers everywhere and flowers all through summer.

To get the best results from Crysanthemums they should be grown in a different part of the garden each year. Or, if that is not possible, they should be lifted right out and the soil dug deeply and some fresh soil added. One small off-shoot is sufficient for each plant, and if cut back several times during the year it will be quite a large bush when flowering time comes. They should not be forced along, but just allowed to exist until about 1st February, when they should have a good mulching and a little superphosphate and plenty of water and liquid manure once a week. The flowers will be much larger and have better colouring if the wood is all new. If they are allowed to grow tall the flowers are not half so good, and they will all have to be staked. Dis-budding is, of course, essential with the large varieties. Otherwise it is better to grow the small and medium sorts. There are hundreds of different ones to choose from. "Louisa Pockett" usually takes the prize for the best white one in most of the shows. But my favourite white one is "William Turner." It is absolutely pure white and very curly.

There are so many beautiful coloured ones that it is hard to say which are the best, but the Autumn Tints are general favourites. Some very nice ones can be grown from seed. Only the single ones, of course, have seeds, and most of the seedlings have to be culled out, but some of them turn out really good.

It is best to grow some early flowering and some late ones, and by doing a fair amount of disbudding you will have blooms for quite a long period. The single ones are very beautiful for cutting, and do not need so much attention as the larger double ones. Some naturally grow taller than others, so the beds and borders should be planned so that the short ones are in the front.

Eighteen members attended the April meeting. Misses L. Chilman and C. Daniels demonstrated basket making. (Secretary, Miss D. Sampson.)

WASLEYS.

Officers were elected at the February meeting. Mrs. R. Currie won the Rug Competition. On 3rd March Mrs. Day presided over an attendance of 30 members. Apple recipes were exchanged. Mrs. Day read a paper, "Individuality," at the April meeting, and musical items were given by Misses J. Siebert, J. Hancock, and C. Carthew. Mrs. James, of Gawler, read a paper, "Chiropody and Beauty Hints," on 5th May. Forty-two members were present. (Secretary, Miss M. Oliver.)

WILKAWATT.

There was a large gathering of ladies—72 members and visitors—at the first meeting for the year, which took the form of a social afternoon. The Parrakie and Smithville Branches were invited and were well represented. The hall was beautifully decorated with flowers. Items were rendered by Mesdames Steer and Koch and Misses Goode, Young, Neville, and Priess. Two competitions were carried out by Mrs. Steer. A presentation was made to Mrs. H. Brooker, who is shortly leaving on a trip to England, from the members of the Wilkawatt Branch, who wished her *bon voyage.*

Sauce and chutney recipes were read by Mrs. A. Young.

The April meeting was held at Mrs. Young's residence, twenty members and visitors being present. Mrs. H. Billing read a paper, "Home, Friendship, and Literature." She also read articles on "The Perfect Guest" and "The Women's Agricultural Bureau." On 10th May members exhibited and discussed knitting, crochet work, and fancy stitching. (Secretary, Mrs. A. Oram.)

WILLOWIE.

On 12th March the meeting was devoted to recipes of "Afternoon Tea Dainties." Mrs. Crisp exhibited jam made from jam pulp.

Reading.

At the May meeting the following paper was contributed by Mr. W. Dawson of the local public school:—

In the first place I would like to give a definition of reading. To me, reading is an unlocking of the noble thoughts of the past so that the great ideas that great men have created throughout the ages become our own, and the work of the teacher is to see that children are taught so to read and speak that some of these treasures become theirs in fullest measure. It is a matter of first importance that children should be encouraged to form the reading habit, and when the desire is present in the child it should not be frustrated by lack of books. In every home there should be a library of books for all ages; a library to which the child can turn, and the parents should always encourage the child in this reading habit. Those children who are lovers of books give no cause for anxiety about their education when they leave school. They will then have the opportunity, or should, of satisfying their desires by joining a public library. There are many reasons why children should read much. These are the chief objects:—Firstly, enlargement of the child's vocabulary; secondly, increased facility of expression; thirdly, the acquisition of knowledge; and, finally, an appreciation and enjoyment of literature. In the Middle Ages books were written by hand and called manuscripts. The monks and others spent much time in producing a single book. These books were carefully and beautifully made, and for centuries were chained to library shelves or desks. The invention of printing in the fifteenth century, just when people throughout Europe were becoming interested in learning, came at the right moment. Books became numerous and cheaper, and very many benefited. William Caxton invented printing in England about 500 years ago. On one occasion when Edward IV. visited Caxton's printing press he remarked that the common people would be getting too much knowledge. A little knowledge is dangerous, but. now in almost every civilised part of the world more than 85 per cent. of the inhabitants can read and gain unlimited nowledge of the past and present in literature, art, music, architecture, &c., and Caxton's work about 500 years ago has born fruit and made the lives of people more fuller and able to appreciate the best things of this world.

What is the average Australian youth who has not had a secondary or university education interested in? Sport and pleasure might be given as the answer. Both are useful in promoting bodily welfare, sociability, &c., but one is forced to believe that sport and pleasure are being nationally regarded as the "be-all" and end of existence. How many of our young people can talk intelligently about Shakespeare, Newton, Schubert, Wagner, and other intellectual giants of the past and present? Indeed, one is looked upon as a freak if one mentions these names, or one is suspected of trying to cram highbrow stuff into unwilling minds. Yet these great names should be familiar to the truly educated person who has attained culture and refinement. In every school there should be a reading room with references to literature, art, astronomy, music, science, natural history, geography, history, &c., in order to give the child a glimmering at least of the great complex and dependent systems of human knowledge. Some children might be led along this avenue if a reading reference room could be opened. The more the avenues the more the interests and the more chance there will be of touching the heart and minds of our children, no two of whom are alike.

Another purpose behind this room would be the inculcation in the minds of the pupils of a love of interests that are profitable and permanent, so that when they grow up they will be richer in mind. When thrown on their own resources during their leisure time they will not be like poverty-stricken minds, too frequently seen nowadays, who are so ill-equipped mentally that on several nights a week they must rush out to amusements. The more they go the greater the thirst. If we could have a room in our school that could influence only two or three children to take an interest in the calm, peaceful, and permanent things of life it would have justified its existence.

Furthermore, it has been said that the test of an educated man is not so much that he has knowledge, as that he knows where it can be found and when he can search for it. Children in this district would probably never have a chance in their own homes to see such books as there would be in a reference library room. My impression is that rural children are not, as a general rule, interested in or given to very much reading out of school.

The length, breadth, and depth of their literature outside of school consists of schoolboy stories. We have all read these, and most of us will say that they have done no harm. But did we stop at that stage? We have passed through it to something better. What is to be said of these individuals great in number who read nothing but trivalities even when they reach manhood or womanhood, and some reading nothing at all? That is the problem that we have to face in Australia. It explains the narrowness of outlook, the class hatred, the superficial opinion on politics, the elements of mob rule, the "go with the crowd" and going along the line of least resistance. It is appalling to think that boys and girls whose education ends at about 14 and 15 have not had a chance to catch a glimpse of the margin of culture.

A travel talk was given by Miss M. Kumnick. (Secretary, Mrs. E. Foulis.)

WILMINGTON.

On 14th April Mrs. Spaeth gave an interesting paper on cutting up of a beast and handed round a diagram showing the different parts and how to cut them.

Miss Christophersen gave a most interesting paper on her trip to Phillip Island and Cowes.

Competitions:—8 entries in tomato sauce, Mrs. Noll first, and Mrs. Cole second; 4 entries in cornflour sponge, won by Mrs. Pengilly; 16 entries in crochet doyley, Mrs. Cole first, and Mrs. G. Noll second; 2 entries in knitted toy, won by Mrs. H. Noll.

Dressmaking in the Home.

The following paper, as well as a demonstration, was given by Miss Saunders at the May meeting.

Clothes, we are told, make the man, but they can and often do mar the woman. Clothes have never been more charming than they are to-day nor have they been easier to wear. The modern trend in dress is towards comfort, and when choosing or making a frock let simplicity be a golden rule. Fashion's most literal foundation is the corset. If you are of the large figure type it is well worth while to purchase an expensive corset, belt, or corselette. No matter how well cut the frock may be, the line will be wasted if the figure is clumsy. It is a good plan to be fitted for the corset as carefully as one is fitted for a frock.

For the benefit of the home dressmaker the following hints will be useful. The person being measured should stand still and erect. Measurements are:—Bust, not too tightly; waist, fairly tight; hips, 7in. below waist; seat, 3in below hips; neck to waist, from small round bone in back of neck; neck to hem, continue from waist; shoulder; sleeve, underarm; across back, 4in. down from neck.

Cutting Out.—Fold material with right side inwards and selvedges together. Lay material as near as possible full length on the table with fold facing you. Always cut garment with the grain running up centre of pattern. Place largest pattern first, fit the smaller ones in between. When cutting out a floral material note whether the flowers and leaves all run one way. If they do, cut every part of the dress with the design running one way. Some woollen materials have a smooth finish running one way. To discover this, pass the finger tips over the material. It is called the nap of the material. Always have the nap running down the garment. Velvet is usually cut with the nap or pile running up. It gives a much richer tone to the dress.

Pressing Notes.—To secure smartness and finish, the dress must be well pressed. Do not wait until the dress is put together before pressing. Press all seams as the work proceeds, both before and after neating. This will give a well-made and finished appearance to the dress which will never be obtained by relying only on the final pressing. All materials must be pressed on the wrong side. When pressing pleats in a winter dress, dip a piece of sheeting in cold water, wring out as dry as possible and press the pleats on the wrong side, through the cloth. This will give an even moisture and a flat, well-pressed pleat. Iron the cloth until quite dry and the steam stops rising. Use a hot iron, as a warm iron used on a damp cloth shrinks the woollen material underneath. Velvet must not be pressed flat on the table, but the seams passed lightly over an iron held upside down.

Fitting the Dress.—Always mark the centre front and centre back with white tacking thread. Look at the shoulders. If the front pulls in slanty creases from the neck towards the armhole untack the shoulder seam and move the front edge a little from the neckline. If too much fulness is in front of the armhole, lift the shoulder at the armhole end. Sometimes with a fairly large bust the front part of the lower armhole is inclined to poke. Remedy this by taking a small dart—woollen material may be shrunk away. The best way to fit the sleeve is to find the centre of the top curve, and the shoulder line, which is usually ½in. back. If the sleeve drags towards the front the curve at the top is too shallow—let out more at the seam and cut a little deeper from the underarm of the sleeve. If creases show at the back, sleeve is set in wrongly—the top centre point being probably too far towards the back. Certain fulness must be allowed at the back to permit of easy movement. Practically all sleeves come under two kinds, the seam-to-seam sleeve and the blouse sleeve. The former is easily recognised, as the front and back are practically similar. The blouse sleeve is cut away at the back. The seam of the seam-to-seam sleeve is placed to the underarm seam of the bodice. The seam of the blouse sleeve is placed 2in. to 2½in. forward on the front of the bodice. The new high sleeve gathered or pleated at the top is designed from the ordinary seam-to-seam sleeve by cutting the top about 3in. higher.

Facings.—If narrow facing is required for a curved line, cut the strip on the cross about ½in. wide. If a wider facing is required for a curved line, cut to the shape of curve. For a V shape always cut to shape.

To Finish a Hem.—(*a*) Plain hem for light material—turn in raw edge and machine stitch. Turn up hem and slip stitch to garment. (*b*) Woollen material with binding. Stitch binding to edge, then slip stitch binding to garment.

Sweet Making.

Mrs. Pengilly read the following paper:—

There are several kinds of sweets one can make with success from the many recipes published in books, and papers. Glucose is used quite extensively to-day, to stop sweets from going sugary, as they often do when made with cream of tartar and vinegar. The necessary tools to carry out sweet making with success include an aluminium saucepan to hold two quarts. Any kind of stove may be used, so long as it has a clear, even heat, so that the syrup will not scorch before the proper degree of boiling is reached.

It is best if possible to have a marble slab for cooling and handling candy syrups. Often one can be obtained from an old wash stand, failing this, a slab of sheet iron may be used. It must be perfectly smooth, otherwise it is likely to grain the sugar. Butter or olive oil may be used on the slab for making toffees, etc., but no grease is used for cream confections.

Sugar boiling is the most important part of sweet making, so that a thermometer is necessary. Success depends on the thermometer and its use, and practice makes perfect in the use of it. The thermometer is placed in a saucepan, which is allowed to boil over an even fire until the right degree is reached, when the mixture is poured straight on to the slab or into a tin. Thermometers can be had from 12s. 6d. upwards.

A spatula is also needed, or an old butter pat will serve the same purpose.

A chocolate dipper is another tool that is needed, it is a thin wire 3 pronged fork, and is useful for quite a lot of jobs such as the making of Lamingtons.

A white brush is another essential to keep the sugar down the sides of the saucepan. If the sugar is allowed to remain on the sides it may spoil a whole batch.

Degrees for Boiling.—The feather or soft degree is reached when the temperature reaches 238deg. to 240deg. on thermometer. This is used for cream fondants and other cream candies. The stiff ball degree is reached at 248deg. to 250deg. and the crack degrees at 260deg. to 265deg., used in candy caramels, chewing kisses, and many toffees. Sugar and maize syrup will burn more quickly than sugar and cream of tartar, which may be boiled to 330deg. with the correct heat.

Recipes.

Fondant.—Numbers of sweets have fondant for centres. There are two kinds, one used for stock manufacturing on a larger scale, and a plain fondant. This is made of sugar, cream of tartar and water and boiled to 240deg. Method; pour on to a damp slab, and as soon as cool work with a spatula, turning the outside edges into the centre. The batch then becomes cloudy, continue to beat and stir it until it forms into a white lump. Knead with the hands, cover with a piece of damp white cloth and allow to mellow. Mash down and knead like bread dough until it becomes soft and creamy, store in a stone jar, cover with wax paper, and use as needed. This fondant is better if made a couple of days before using. Different flavourings and colourings are used to suit the taste, then finally coat with chocolate.

Snowballs.—Soak 1oz. gelatine in one cup water for 2 hours, add one cup hot water 1lb. white sugar and boil 20 minutes. Allow to cool and when nearly cold add 1tspn. vanilla and beat with an egg beater until fairly firm. Pour into a buttered mould and allow to stand 4 hours. Cut into squares, dip in chocolate and roll in cocoanut.

Chocolate Coating.—Melt some crocolate with a little warm water add a little butter (melted). The mixture should be fairly thin. Use a large saucepan when making this mixture, as it expands.

Milk Kisses.—Take 10ozs. sugar, 14ozs. maize syrup, moisten with water and boil to 270deg. Take off fire and add 2ozs. butter and a large tbspn. condensed milk or cream and 1 tspn caramel colouring. Beat this all in and out, roll into long sticks with the hands and cut into ¾in. lengths with buttered scissors. When cold wrap each piece in waxed paper. Malt or Honey kisses may be made by adding malt or honey in place of condensed milk.

Plain Toffee.—1lb. sugar, 4ozs. maize syrup. Moisten with water, put on fire, do not stir after syrup has dissolved When 310deg. pour into greased tin. Different nuts can be mixed to alter this plain toffee to nut toffees.

Cocoanut Ice.—1lb. sugar, 5ozs. maize syrup. Moisten and boil to 235deg. Take off fire and beat up nearly white, add 4ozs. cocoanut, divide into 2 parts, pour one in greased mould, beat up other half, add rose colouring and 1tspn. vanilla. Pour on top of white. If the second half becomes too stiff, put back on slow fire to soften a little and pour out.

Butterscotch.—Make the same way as plain toffee, boil to 315deg., take off fire and when it has ceased boiling add 2ozs. butter. Stir until worked in saucepan. Warm again if necessary to prevent syrup from setting and pour out in greased tin or slab. Cut into squares 1in. x 1in. and wrap in wax paper. To cut use a warm buttered knife, mark shape on top, then hit knife straight through; never drag the knife; and cut up while lukewarm.

Australian Delight.—2ozs. gelatine soaked in water for 1½ hours, add 2lbs. sugar and boil for 20 minutes. Colour and flavour to taste. Pour into slightly damped dish, leave 12 hours, cut up and roll in either icing or castor sugar.

Honeycomb.—1lb. sugar, 2ozs. maize syrup. Moisten with water and boil to 300deg. quickly. Take off fire, stir in a large tspn. butter, 2 large tspns. bi-carb soda, give 6 sharp stirs only and pour on buttered slab. When half cold fold into two like a sandwich. Cut with buttered scissors before quite cold into square or diamond shapes. Cover with wax paper. They may also be used as centres for chocolates known as crunch foams.

WIRRABARA.

On 3rd March members visited and inspected the works of the Laura Ice and Produce Co., accompanied by 22 members. Mrs. Watt (President) attended the March meeting of the Yandiah Branch. Mrs. C. Curnow spoke on a trip to Tasmania.

Exhibition of Handicrafts.

The committee of the Women's Branch of the Agricultural Bureau at Wirrabara are to be congratulated on the success which attended their efforts in staging their first exhibition which took place in the local institute on Saturday, 23rd April.

With nearly 700 entries on the occasion of their first attempt at a function of this description, they have been given every encouragement to conduct a similar fixture annually.

Mrs. Orchard, President of the 1937 Congress of the Women's Branches of the Agricultural Bureau, in declaring the show open, congratulated the exhibitors on the very high standard of work, both in the fancy work and knitting sections, of which she was the judge. Mrs. Jackson, of Caltowie, who judged the cookery and miscellaneous sections, said that the exhibits were equal to any she had seen in any of the country shows. Trophies valued at over £30 were presented by various donors.

Mr. E. L. Orchard presented trophies and prizes at the close of the show, and on behalf of the President thanked the Secretary (Mrs. E. Harding) for the efficient work she had done in connection with the exhibition. Prize list:—

Baby's Knitted Set.—Miss I. Pointon, 1; Miss D. Marner, 2.

Lady's Knitted Cardigan or Pullover—Mrs. T. Webb, 1; Mrs. R. A. Schaefer, 2.

Pair Men's Knitted Socks.—Mrs. T. Webb, 1; Miss M. Hatch, 2.

Bed Jacket, Knitted or Crotchet—Miss Winneke, 1; Miss Brokenshire, 2.

Baby's Knitted Frock—Miss R. Wurst, 1; Mrs. M. Phillis, 2.

Lady's Knitted Vest—Mrs. W. Wade, 1 and 2.

Knitted or Crochet Cushion—Mrs. K. D. Manning, 1; Mrs. Zilm, 2.

Tea Cosy, Knitted or Crochet—Miss M. Rosewall, 1; Mrs. Craig, 2.

Gent's Pullover—Mrs. T. Webb, 1; Miss G. Hoskins, 2.

Unspecified Knitted or Crochet Article—Mrs. M. Phillis, 1; Miss L. Hoskins, 2.

Supper Cloth, White Work—Mrs. Weckert, 1; Mrs. B. J. Hunt, 2.

Supper Cloth, Coloured—Mrs. Plew, 1; Miss I. Pointon, 2.

Toilet Set, White Work—Miss Keller, 1; Mrs. H. Hunt, 2.

Toilet Set, Coloured—Mrs. Cleveland Hill, 1; Miss A. M. Curtis, 2.

Lady's Nightdress—Mrs. Weckert, 1; Miss M. Hatch, 2.

Two All-crochet d'Oyleys—Mrs. J. Porter, 1; Mrs. Blunt, 2.

Baby's Smocked Frock—Mrs. Torr, 1; Miss V. Close, 2.

Pillowshams—Mrs. Kellar, 1; Miss R. Donnellan, 2.

Hooked Rug made from Waste Material—Mrs. A. J. Watt, special prize; Mrs. W. Noblet, 1; Miss D. Venables, 2.

Collection of Six Pieces—Mrs. Weckert, 1; Miss M. Zwar, 2.

Cushion Hooked Work made from Waste Material—Mrs. S. Kellar, 1; Mrs. Phillis, 2.

Unspecified Article—Miss A. Passow, 1; Miss M. Zwar, 2.

Sponge Roll—Miss A. Anderson, 1; Mrs. W. Wade, 2.

Pound Cake, Dark—Mrs. Eddie Borgas, 1; Miss M. Deer, 2.

Sponge Sandwich, Uniced—Mrs. E. Hollitt, 1; Miss H. Hollitt, 2.

Bread, Home-made—Mrs. B. Joppich, 1; Mrs. A. J. Watt, 2.

Yeast Cake—Mrs. Carr, 1; Miss M. Joppich, 2.

Sultana Cake—Mrs. C. Zwar, 1; Mrs. W. Wade, 2.

Sausage Rolls—Mrs. C. Jettner, 1; Mrs. A. Lewis, 2.

Albert Cake—Mrs. A. Lewis, 1; Mrs. Schneider, 2.

Six Cakes, Fancy Iced—Mrs. Seaman, 1; Mrs. A. J. Watt, 2.

Yeast Buns—Mrs. J. R. Deer, 1; Mrs. E. Woolford, 2.

Cream Puffs—Mrs. C. Jettner, 1; Miss S. Klemm, 2.

Fancy Biscuits—Mrs. Seaman, 1; Mrs. L. Manz, 2.

Jam Tarts—Mrs. Seaman, 1; Mrs. H. McLean, 2.

Scones—Mrs. D. Deer, 1; Mrs. Eddie Borgas, 2.

Biscuits and Cakes made from Honey—Mrs. Seaman, 1; Mrs. W. Wade, 2.

Fancy Iced Cake—Mrs. C. Zwar, 1 and 2.

Three James, Assorted—Mrs. Osman, 1 and 2.

Three Jellies, Assorted—Mrs. P. Phillis, 1; Mrs. A. J. Watt, 2.

Three Marmalades—Mrs. D. Anderson, 1; Mrs. R. Sizer, 2.

Three Sauces—Mrs. P. Phillis, 1; Mrs. E. Harding, 2.

Three Pickles—Mrs. A. Lewis, 1; Mrs. Osman, 2.

Three Chutneys—Miss A. M. Wood.

Three Preserved Fruits—Mrs. S. Keller, 1; Mrs. A. Lewis, 2.

Three Preserved Vegetables—Mrs. P. Phillis, 1; Mrs. S. Keller, 2.

Home-made Soap—Mrs. C. Hollitt, 1; Mrs. P. Anderson, 2.

Pound of Butter—Mrs. J. Porter, 1; Mrs. Stanley, 2.

Glass of Honey—Mr. Woodlands, 1 and 2.

Dozen Hen Eggs—Miss M. Hatch, 1; Mrs. L. Hitch, 2.

Five Preserved Fruits—Mrs. A. J. Watt, 1; Mrs. A. Lewis, 2.

Vase Flowers for Table Decoration—Mrs. Seaman, 1; Mrs. Grant, 2.

Bowl of Flowers—Mrs. Seaman, 1; Mrs. A. J. Watt, 2.

Bowl of Stocks—Mrs. A. J. Watt.

Table Rockery—Mrs. Grant, 1 and 2.

Three Ferns—Mrs. A. J. Watt, 1; Mrs. C. Zwar, 2.

Three Foliage Plants—Mrs. C. Curnow, 1; Mrs. L. Hitch, 2.

Basket Fern—Mrs. C. Zwar, 1 and 2.

Palm—Mrs. C. Zwar.

Six Dahlias—Mrs. A. Lewis, 1; Miss M. Brown, 2.

Cabbage—Mrs. E. Curtis.

Cauliflower—Mrs. W. Wurst, 1; Mrs. E. Curtis, 2.

Carrots—Mrs. E. Curtis, 1; Mrs. C. Curnow, 2.

Turnips—Mrs. C. Hollitt.

Red Beet—Lewis Sizer.

Lettuce—Mrs. C. Hollitt.

Grapes—Mrs. E. Piper, 1 and 2.

Dozen Apples—Miss D. Marner, 1; Mrs. A. J. Watt, 2.

Collection of Apples—Mrs. A. J. Watt, 1; Miss D. Marner, 2.

Pears—Mrs. A. J. Watt, 1 and 2.

Dried Fruits—Mrs. A. J. Watt, 1; Miss A. M. Wood, 2.

Vegetables—Mrs. W. Wurst, 1; Mrs. C. Jaeschke, 2.

Crystallized Fruits—Miss A. M. Wood, 1; Mrs. A. J. Watt, 2.

Knitted Article—Betty Hollitt, 1; Lois Cugley, 2.

Knitted Vest—Inez Seaman, 1; Heather Harding, 2.

Baby's Knitted Frock—Ruth Joppich, 1; Shirley Lewis, 2.

Woodwork Models—Harry Baldock, 1; John Taylor, 2.

Useful Article, 15 or under—Nancy Watt, 1; Cavell Sutter, 2.

Dressed Doll, 9-11 years—Dorothy Craig.

Dressed Doll, 12-15 years—E. Weckert, 1; Shirley Lewis, 2.

Mat from Waste Twine—Rex Hollitt, 1; Ron Hollitt, 2.

Useful Article—Mr. N. Hunt, 1; Mr. P. R. Phillis, 2.

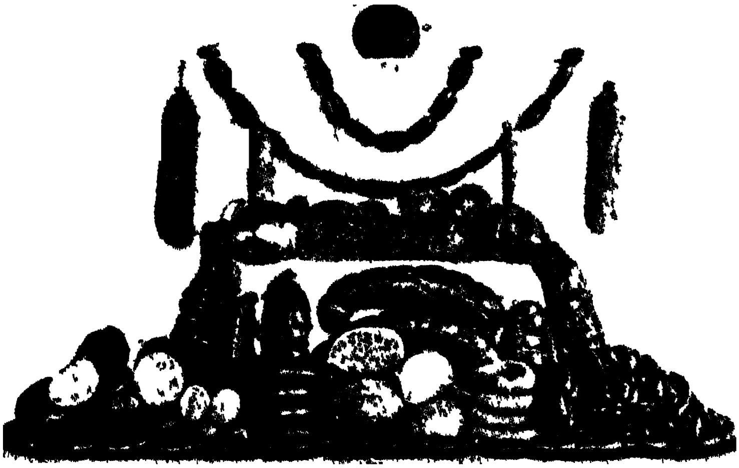
Handicrafts—Mrs. S. Keller, 1; Mrs. A. J. Watt, 2.

Pig Products.

[Paper read by Mrs. Jaeschke at the May meeting.]

Of all the animals that serve as food there is none that provides so many delicacies as the pig. Besides the fresh meat, it provides many kinds of sausages, brawn, and there is ham, bacon, lard, &c.

Curing.—When cutting up the pig it is better to leave the hipbone on the ham. Although this may mean an extra week in the brine it gives the ham a smoother surface and there is not so much danger of trouble from flies. The legs should be hung out a second night to cool thoroughly. The feet should then be sawn off beneath the hock. The bacon will pack better into the cask if the sides are cut into several pieces. The fleshy parts of the ham should be rubbed with saltpetre; 1 lbspn. to a ham is quite sufficient, provided the pig has bled well and has not been bruised in handling. Shoulders could be treated in the same way as the hams. All meat should be rubbed over with salt and packed into a cask fleshy side uppermost. Cover with a brine made of 1lb. of salt to 1 gallon of water. Place a board on the meat and on this a heavy stone to keep the meat from floating. An airy shed is the best place for the cask. Examine and stir the brine every other day.



After four to six weeks take out the meat and soak in fresh water for half an hour. Take out, and when dry enough rub white pepper into the fleshy part of the ham, then with a bag needle draw a twine twice through the foot end to catch the hook in and hang up to smoke.

Smoking should be done in the afternoon to give the meat a chance to cool during the night. Unless the weather is damp the bacon should be done in a fortnight; the ham will take longer. A makeshift smokehouse can be made of an old iron tank which has lost the bottom. Turn it upside-down on some bricks and hang the meat on a couple of iron bars placed over the top of it. Cover with iron sheets and place in a shady spot. Put a pan of live coals under the opening, cover with coarse chips, and over them a thick layer of fine ones, which should be damp. An old fireplace could also be utilised for the purpose by driving a couple of iron pegs into the side of it, about 6ft. from the floor, to hang the meat on. Care must be taken not to let the fire break into flames; add more wet chips to stop it. Where several pigs are slaughtered each year a smokehouse built of stone is a necessity.

Liver Sausage.—Together with the liver of the pig cook the same quantity of cheeks. Both should be rather underdone. Put through a fine mincer, add an onion finely minced, also pepper and salt to taste. Fill into smooth runners of the wider kind, allowing for shrinkage of these and expansion of the contents. Simmer carefully. They are best eaten cold and make a tasty filling for sandwiches.

Rice Sausage.—For rice sausages the meat of the head, heart, lungs, kidneys, spleen, and tongue is used, also the crumpets from rendering down the net and scrap fat. After the tongue has been cleaned, boil for half an hour and scrape off the skin, then boil with the rest of the meat until the flesh leaves the bones. Mince all lean meat with a fine mincer and cut the fat meat into dice. Boil 2 cups of rice in about 8 pints of the broth for half an hour, add to the meat, season with pepper, salt, marjoram, thyme, allspice, carraway seeds, and an onion chopped finely, mix, and when the seasoning is right add the blood of the pig. Mix and fill loosely into the stomach and widest gut, stitch and tie up and simmer gently from 1 to 3 hours, according to size.

Metwurst.—The best meat for metwurst is on the back of the pig, the lean layer on each side of the spine, a piece of leg of mutton or beef could be added with advantage where the pig is rather young and the meat too soft. Cut into pieces for the mincer and leave several hours to drain. Mince very finely together with about half as much bacon fat from the back of the pig, season with salt, white pepper, a handful of sugar, a pinch each of saltpetre, nutmeg, peppercorns, and garlic, also carraway seeds. Mix thoroughly and fill very tightly with a forcing machine into strong cases, such as cow gut or the "bung" end from the sheep. The best cases for the purpose are made of the skin that covers the kidney fat of the pig. While still warm, spread out the fat on a board with the skin uppermost. When thoroughly cold it can easily be pulled off. Trim edges, place between lunch wraps, and stitch together with long stitches on a sewing machine. All sausages should be pricked with a darning needle wherever air collects during the filling process.

Frying Sausages.—For this all small pieces of meat and the skins from which the fat has been cut are used. Cover with water and boil until the skins are tender. Mince finely, add pepper, salt, and nutmeg to taste, and mix together with the broth. Let cool and fill into thin runners and tie each small sausage separately. All sausages improve in flavour if smoked for several days.

Brawn.—Cover with water and boil the trotter and the tail of the pig until they fall to pieces. Pick out the bones, cut up the meat, return to the fire with the broth, add a pint or more water, a cup of vinegar, peppercorns, and salt to taste. Boil for a few minutes and pour into dishes to set. It is excellent for cold lunches with radishes, pickled cucumbers, or onions.

Boil Pickled Meat.—All surplus meat and bones that are not to be smoked and cannot be used at once are best pickled separately, and this is the best method. Into a scant ½ petrol tin of boiling water put 3 large cups of salt. Boil and skim and add pieces of meat not more than 4in. "thick" until the brine rises within 2in. of top. Turn top pieces occasionally and boil for half an hour. Stand outside in a dish of water to cool thoroughly. Tie down securely and store in a cool place. The fat from the top should not be removed until opened for use.

Rendering Down Lard.—The lard of the pig can be divided into several classes. Kidney lard is the best and can be used for baking all sorts of the finer cakes. Next comes that from the back of the pig. The lard from the belly is inferior, but still useful for baking doughnut fritters, etc. Lastly comes the neck and scrap fat, which has a strong flavour, but is very useful for making ointments on the farm, for dressing wounds of all kinds. The lard can either be cut finely or put through a coarse mincer; the latter way is the quickest. Fry until a light brown, and strain the lard through a fine sieve or a piece of muslin. The bladder of the pig or cow may be used as a container for lard, but the latter should not be hot or else the bladder will shrivel.

YANDIAH.

Fourteen members and 27 visitors, including members from Wirrabara, attended the March meeting, when Mrs. Curnow spoke on a trip to Tasmania. On 7th April Mesdames C. and F. Jettner gave a talk on a visit they had made to Melbourne, Canberra, and Sydney. (Secretary, Miss V. Keller.)

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